

The SHORT WAVE Magazine

VOL. XXVII

APRIL, 1969

NUMBER 2

TRIO

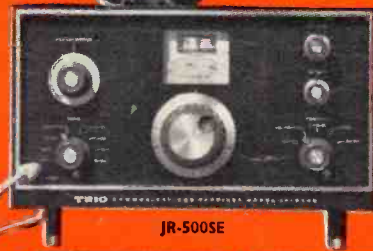
COMMUNICATIONS EQUIPMENT



SP-5D



HS-4 HEADPHONES



JR-500SE



9R-59DE



PS-500AC



TS-500



Full details of these outstanding Trio Models, together with the name of your nearest appointed stockist, are available on request from the Sole U.K. Distributors —

B.H. MORRIS & CO. (Radio) LIMITED

84-88 NELSON STREET, TOWER HAMLETS, LONDON, E.1 Telephone: 01-790 4824

THE FIRST NAME IN COMMUNICATIONS

THE FIRST NAME IN COMMUNICATIONS

THE FIRST NAME IN COMMUNICATIONS

Announcing another world beater from

KW

THE NEW KW 2000B



SSB TRANSCEIVER: 180 watts P.E.P. 10-160
Metres complete with AC PSU, VOX,
P.T.T., I.R.T./I.T.T.

plus the usual KW Quality and Reliability

- TWO-SPEED VFO DRIVE
- IMPROVED VFO READ-OUT
- NEW, PRECISE METERING
- ATTRACTIVE PANEL LAYOUT

Other KW Products:
KW Antenna Switch
(3 position), KW E-Z
Antenna Match Unit, KW
PEP Meter, KW Match SWR
Indicator, KW Low-Pass
Filters, KW Trap Dipoles,
KW Dummy Load, KW
Q Multipliers



Write for illustrated detailed specifications on the KW 2000B; KW Atlanta; KW Vespa Mk II; KW 201; KW 1000 and our list of KW Tested Trade-ins.

K. W. ELECTRONICS LTD

1 HEATH STREET, DARTFORD, KENT

TEL: DARTFORD 25574 CABLES: KAYDUBLEW DARTFORD

J. B. LOWE 50-52 Wellington Street, Matlock, Derbyshire

Tel.: Matlock 2817 (2430 evenings)

Let's fill a page with means this month. I'm in a real old snarling mood. Mainly because some London spiv outfit robbed me. Their advertising reads "all goods are new, first quality manufacture only and subject to makers full guarantee." Fair enough, I think, in my simplicity and I order some OC171's. "Funny" I thought when I got them "OC171's should be chunky efforts with 4 bits of wire, whereas these are stamped OC171, sure enough, but only 3 wires and a T05 case." VERRY ENTRESTING. New they may be, first quality manufacture they may be, subject to makers full guarantee they may be, but OC171's they most certainly are not! Ah, well, that's the last time I deal with that outfit, you can bet your sweet bippy. Unfortunately the laws of libel prevent me from warning you against a bunch of spivs publicly. In my case, it was O.K.—I only wanted them for a fool-around project. But think of the thousands of mugs who don't know enough to realise they've been done. Some poor lad who can't figure out why his transistor converter or something is dead. Ah, well, one lives and learns. Let me just add that if you too have been caught—write to (a) Mullards who are ready to take a swipe at the spivs, and (b) the Publishers who, provided enough people shout, will stop their advertising. Can't understand the mentality of these crooks—it's just as easy to make a living honestly. As I said, I'm in a snarling mood, ready to take a swipe at anyone—particularly advertisers who claim perfection for things which are very, very far from perfect. It constantly amazes me that people can be fooled by such blah. What really riles me is that the advertiser is taking us for mugs. His opinion of us changes the moment we read this stuff. Most of us know what the intelligence to see through it. And that gets me mad. Once again, the laws of libel stop me from blowing my stack, but honestly, lads, just look at some ads and the deliberate attempts to fool us. Here again, readers of this magazine should know something of spec sheets and how they can be distorted, but what about the poor chap who laps it up as gospel—he's done proper, as they say. Most of us know what constitutes a mechanical filter, we know the difference between a spec which claims 2.4 kc/s. selectivity and one which says 2.4 kc/s. at —6 dB. at 4.5 kc/s. at —60 dB. We know the difference between so many microvolt sensitivity for 10 dB. S/N ratio and better than so many microvolts for 10 dB. S/N ratio across the entire tuning range. We know the importance of image rejection, internally generated signals, stability, etc. and do our best to find these things out. But what about the poor laddy who doesn't know. All he thinks is, it's widely advertised and everyone sells it, it must be good. Poor lad, he's a lot to learn. When something new comes on the market, I try it out. If the maker claims 2 kc/s. selectivity and I measure it at 4 kc/s. 6 dB. down (it sounds nice) Sure it sounds nice—with a filter as broad as a barn door it's bound to sound nice) and if the maker claims 1 microvolt sensitivity and I measure it at more than this, and if it generates spurious signals then thank you very much, but I won't touch the damn' thing with a barge pole. Regardless of the profit margin. I am (of course!) referring to the FE Super 600GT I had at the Show. The spec. sheet from Japan looked excellent, the design looked excellent, the price was attractive. BUT, it would not stand up to hard testing, so I don't flog it! If anyone wants a stinker, they can have it well below cost for £120! The joke is though that it has manufacturers specs. that'll knock your eye out. Absolutely marvellous. Nevertheless, it's a stinker. I can tell you I've tested quite a few rigs and that's why I stick to Sommerkamp, Star and Inoue. Maybe I'm a chump—maybe I should sell some of this other gear, if there's more money in it, but whenever I'm tempted to make a fast buck, I think of the businesses that have come and gone over the past years. No Sir, I'd like to be in business for many years yet, so I'll not sell anything questionable in any way. Altruistic? No, just plain common sense. However, all this grumbling and moaning won't flog anything, so lets get stuck in. Something new this month.

LOW PASS FILTERS: Beautifully made and furthermore, something which really delights me, they're made in England. Insertion loss below 1 dB, stop band attenuation around 80 dB., capable of the full legal limit at 2: 1 SWR or less. In short, a cracking good tool.

Prices: 50 or 75 ohm (state which, it's important!), with Belling Lee sockets, £4 10s. 50 ohms with SO239 sockets £5.

Another new job coming along—again made in England. A keyer with built-in monitor, CW men tell me it's a good 'un. I wouldn't know—I'm a PTT man, I may back, but I take the word of an independent CW man. He says it's good, it's British made and the price is right! £10. But I haven't many!

I have the well known and popular Katsumi EK9X keyer at £7 15s. This doesn't have a built-in monitor, but I also have the Katsumi monitor. This is a rather superior effort with a quiet keying relay and spare contacts for break-in. £7 15s.

Also in stock, the Katsumi speech compressor at £7 15s. Again a popular tool.

In the big stuff, I have new and second-hand stocks of transmitters, receivers and transceivers to suit most tastes!

Sommerkamp of course. The FR-500 receiver (and mine actually have the crystals in that they're supposed to have 1) covering top band to 10m., 1 kc/s. readout, AM/CW/SSB filters, notch filter. The lot, £130. Let's get this clear though. The FR-500 is not perfect, it is not the best Rx on the market. It drifts, it has images, it does not have 1 dB. noise figure, it has birdies, it cross modulates. However, in spite of all this there is not a receiver anywhere near this price that will equal or better it. Come to think of it, the only Rx I know of that I'd rather have anywhere near the price is the Drake R4B (No, I don't sell them, but I don't mind giving credit where credit is due) Companion transmitter, FL-500, £145. I also have the FT-150 in stock. At £215 complete with both mobile 12v. and mains p.s.u.'s built-in, it represents extremely good value. It's big brother the FT-500 with a 500W p.e.p. input costs, £250 complete with built-in mains p.s.u.

For someone wanting something a little cheaper, take a close look at the Inoue. The receiver is all transistor using lots of FET's around a top quality 9 mc/s. xtal filter. A very sensitive, quiet, birdie free Rx. 12v. d.c. or 240v. a.c. supplies built-in. It's a little beauty and comparing it with other Rx's around the price, well worth £85. The companion Tx uses the Rx's F.O. for transceive operation. Again transistor except V.F.O. mixer, driver and PA (2-6146B's). A nice sounding very clean Tx complete with p.s.u., £95. Where's you'd get a better rig for £180 complete, I honestly know not. Here again, let's introduce some plain honesty. Is the Rx as good as the Sommerkamp FR-500 I'm always asked—of course it isn't. If it were, then I wouldn't sell a Sommerkamp. Certainly it's not as good as the Sommerkamp in respects, but the versatility of the FR-500. However, taking other transistor gear on the market at around the same price as the Rx, there just isn't any comparison.

The Star 700 series also represents excellent value for money. SR-700 Rx at £115 and ST-700 Tx at £135. Last good buy is the National 200 at £145 less p.s.u. I just can't sell these and I don't know why. It is one hell of a good rig for the money. It is not, of course, in the same class as the Sommerkamp transceivers—but it's nowhere near the price either. I just can't understand you chaps. The only thing I've got against it is that it uses the PA pi net as the Rx input stage. Now, the PA tubes' load impedance differs very considerably from the r.f. amp. input impedance, to say nothing of conflicting Q requirements so it isn't really very elegant design. However, Gentlemen, just take a look around and see all the other makes at much higher prices that do exactly the same thing!! Also, by the way, look at Sommerkamp who DO NOT do it—they use proper r.f. antenna coils for the Rx side. Just one of those little things the spec. sheet never mentions! And of course, just one of those little reasons I flog Sommerkamp and not some other brand! However, in spite of this, the National 200 is value for money, and that's my criterion. I honestly think that the above stuff is top value for money, but more than this, you get service second to none. Also of course, it is all ex stock at the time of writing. Anyway, so much for the new expensive stuff. In the second-hand line I have a very good selection of good quality stuff. The snag is that by the time this advertising appears in front of your bloodshot eyes, my current stock will have changed. I don't know what to do—I have some good stuff and if I include it in this guff it will likely be sold long before publication. I've got a good 2 metre converter. Four valves; twin triode r.f. 6BQ7A; 12AT7 xtal osc. 6RR5 mixer and 6AU6 I.F. amp. (28-30 mc/s.). It requires 63v. a.c. and 150 to 200v. d.c. It performs jolly well and is most attractively priced at £10. Lets be honest again (I must be mad!). It is not perfect. It has birdies. I doubt if the noise factor is anything like 1 dB. or less. I'm not a VHF man and thus dead ignorant, but someone may be able to enlighten me. Is there any piece of commercial equipment anywhere in the World outside a laboratory that has an overall N.F. of anything like 1 dB?

C.W. practice sets. These are a good buy for 15/- consisting of a key and buzzer. We don't supply the 1 1/2 volt battery though. Although the buzzer isn't what I'd call T9 (although I've heard a T9 report given to worse chowpi chowpi chowpi chow!) the key isn't bad. Well worth 15/- to anyone wishing to get CW up to snuff. Well, I guess the above waffle will just about kill my sales stone dead this month. However, I console myself with the thought that somewhere amongst you is a man who pays no regard to advertising, a man who studies the circuit diagram and thinks about it, a man who can distinguish between good design and cheap design, a man who can evaluate the worth of a piece of gear. To you, sir, a hearty welcome. Come and delve, it is all ex stock.

SUNDRIES:

Teisco DF1-501 dynamic microphone, high impedance	£2 15 0
16in. 1/2" keys, polished brass with ball bearing pivots	18 6
C.W. Practice sets, key plus buzzer	12 0
S.W.R. Bridges, Hansen S.W.R.3. 50 or 75 ohm	£3 10 0
Bug keys	£4 0 0
Katsumi C.W. Monitors, high speed relay, built-in with spare contacts for break in CW	£7 15 0
Headsets, low impedance, padded	£2 2 6
AR88D manual reprints	£2 15 0
VHF/UHF 50 ohm dummy loads	£2 10 0
COLLINS 5 cycle VFO's, one left	£35 0 0
Tubular trimmers, 1/2-5pF or 3-15pF 1/- each or 10/- doz. Feedthroughs, 500v. 1000pF screw type 1/- each or 10/- doz. Standard Belling Lee coax plugs, metal, 1/4, sockets 1/-. Octal B7G or 59A plugs 2/6 each. SE-05 1000piv 500 mA rectifiers, the ones you can trust, 4/6 each. Panel indicator lamps for standard lilliput bulbs, red or green, 2/6 each. Lilliput bulbs 1/- each. PL259 plugs, 5/- each. Reducers, 1/3 each. Sockets, 5/- each. I have a very nice line in brand spanking new capacitors. Top quality at junk prices.	
ELECTROLYTICS:	
Can type with mounting clips.	
100mF/350v., 5/6; 100-100mF/350v., 6/8; 100mF/450v., 7/2; 40-40/500v., 7/3; 100mF/500v., 7/9; 100-100/450v., 13/2.	
Minute low voltage types —	
16mF/16v., 8d. each, 5/- doz.; 10mF/16v., 6d. each, 5/- doz.; 100mF/12v., 8d. each, 7/- doz.; 100/12v., 6d. each, 5/- doz.; 30mF/16v., 8d. each, 7/- doz.; 100mF/16v., 1/- each, 10/- doz.	

TANTALUMS: 4/2v., 4/38v., 10/12v.—all at 1/6 each. Believe it or not lads, these are normally around the 12/6 mark!

WELLER SOLDERING GUNS £3 12 6

"Expert"—dual heat 100/140W.

"Expert"—kit with solder, spare tips, soldering aid, brush and spanner in strong carrying case ... £4 17 6

"Marksmen"—25W. £1 11 6

"Marksmen"—25W. kit with solder, 2 spare tips and soldering aid ... £2 1 6

Converters, 21 or 28 mc/s. These are hot stuff—twin triode cascade r.f. amp. 12AT7 low noise mixer/xtal osc. and 6AU6 I.F. out. The output is 5-5.5 mc/s., (21 mc/s.) and 5-7 mc/s. (28 mc/s.). They require 6-3v. A.C. and 150-200v. D.C. and are excellent value at £7 10s. We also have a 2m. version of these with an IP of 20-30 mc/s. at £10 it represents extremely good value. All the lovely new stuff can also be inspected at Alan Whitford's, G3MME, 37, Chestnut Drive, Polegate, Sussex, Telephone No. Polegate 4659, evenings and weekends for those who can't get over to Matlock. If you can't get over to either Alan or myself send me a s.a.e. and I'll send you my latest lists.

POSTAGE: PLEASE ALLOW LOTS FOR POSTAGE, WE WILL NOT REFUND ANY EXCESS.

The Bandit, VE8DP/G3UBO.

AMATEUR ELECTRONICS G3FIK

TRIO COMMUNICATIONS EQUIPMENT FROM STOCK. Not a particularly original opening no doubt under normal circumstances but in the light of current events one which is highly significant. By this we refer to the already obvious difficulties which are appearing in the maintenance of supplies of imported equipment due to the recently introduced import controls. Fortunately, however, for the prospective purchaser of TRIO equipment these restrictions despite their severity have not deterred the importers from their policy of meeting the ever-growing demand for TRIO gear, a demand which is the inevitable consequence of marketing quality equipment at sensible prices. Please note we ONLY sell TRIO when it comes to new equipment despite the fact that we are a completely independent Company with obligations to no-one. May we also take this opportunity of stating that we never sell TRIO equipment at so-called 'special' prices our policy being to give our customers careful and detailed attention to orders and enquiries and a first-class and conscientious after sales service. Please don't take our word for this however, ask those who have dealt with us for their opinion.

	£	s.	d.		£	s.	d.
EDDYSTONE EC10 RECEIVERS. A choice of two, both electrically perfect, one in mint condition at Carriage paid	45	0	0	AR88D RECEIVER. This is a somewhat unusual set in that it has been very carefully fitted with a first-class slow motion drive on both the main tuning control and the BFO which makes the reception of SSB so very much easier. Other features include an extal phasing control and a tuning meter and the set, apart from these added features, is in well above average electrical and mechanical condition... Carriage paid	57	10	0
Another in very good condition indeed Carriage paid	39	0	0	BC221 FREQUENCY METERS. Complete with correct calibration charts Carriage paid, £22 0 0 to	26	0	0
LABGEAR LG50 TRANSMITTER. In excellent condition ... Carriage paid	28	10	0	MARCONI TFI44G FREQUENCY METERS. In original transit cases ... Carriage paid	22	10	0
KW VANGUARD TRANSMITTER. Air tested and in FB order ... Carriage paid	36	0	0	AVO ELECTRONIC TESTMETERS. In excellent condition and complete with all leads and RF probe Carriage paid	17	0	0
KW 160 TRANSMITTER. Very nice condition indeed Carriage paid	17	10	0	LEESON Transistorised high gain microphones. Superb speech quality with finger tip PTT bar. Table mounting ... Carriage paid	8	2	6
TRIO 9R-59DE RECEIVER. Mint condition and fully checked ... Carriage paid	30	0	0	TRIO HS-4 LIGHTWEIGHT HEADSETS. Ideal for the 9R-59DE AND JR500SE but, of course, will suit most communication receivers Carriage paid	6	2	6
HEATHKIT RG-1 RECEIVER. In absolutely new condition ... Carriage paid	28	0	0	TRIO SP-5D SPEAKER UNITS. Designed for the two well-known TRIO receivers Carriage paid	4	12	6
HEATHKIT DX40 TRANSMITTER with matching VFO ... Carriage paid	31	0	0	QUALITY TRAP DIPOLES. Employing hard drawn 14 gauge wire and top grade potted traps (500 traps) 80 thru 10 ... Carriage paid	7	0	0
EDDYSTONE 840C RECEIVERS. We have a selection of tested receivers in stock which are in truly excellent condition, from ... Carriage paid	42	10	0	LOW LOSS coaxial feeder for the above at per yard	2	0	
COSSOR 1049 MK. IIIA OSCILLOSCOPE. In magnificent condition and with all operating instructions, etc. ... Carriage paid	28	10	0				
DELTA CONTROL UNIT. Absolutely new condition ... Carriage paid	5	10	0				
HEATHKIT ELECTRONIC SWITCH S-3U. For providing double beam facilities on single beam oscilloscopes. Absolutely new condition Carriage paid	12	0	0				

WE STILL REQUIRE HIGH QUALITY COMMERCIAL GEAR—Please state required price when writing.

Credit facilities. Part exchanges. Adequate S.A.E.'s gentlemen please.

EXCELLENT PARKING FOR THE CALLER

Telephone : 021-327 1497

Fast Mail Order for the Amateur Radio Enthusiast!

AERIAL EQUIPMENT

TWIN FEEDER. 300 ohm twin ribbon feeder similar K25, 8d. per yard. 75 ohm twin feeder, 6d. per yard. Post on above feeders, 2/- any length.

COPPER WIRE, 14G, H/D, 140ft., 30/-; 70ft., 16/-; Post and packing 3/3. Lengths are approx. only, actually sold by weight.

FEEDER SPREADERS. 6" Ceramic type F.S. 10d. each. Postage 2/6 up to 12.

CERAMIC CENTRE PIECE for dipoles Type AT, 1/6 each. P. & P. 1/-.

AERIAL INSULATORS. Ribbed ceramic, 2/6 each. Short stick, 1/- each. Egg, 6d. all plus postage.

2 METRE BEAM, 5 ELEMENT W.S. YAGI. Complete in box with 1" to 2 1/2" masthead bracket. Price: £3 7s. Carriage 5/-.

SUPER AERAXIAL, 70/80 ohm coax, 300 watt very low loss, 2/3 per yard. 50 ohm 300 watt, 2/6 per yard. P. & P. 2/6.

TOUGH POLYTHENE LINE, type ML1 (100lb.), 2d. per yd. or 12/6 per 100 yds. Type ML2 (220 lb.), 4d. per yd. or 25/- per 100 yds., ML4 (400 lb.), 6d. per yd. Ideal for Guys, L.V. Supports, Halyards, etc. Postage 1/6 on all line.

AERIAL DIPOLE KITS

TYPE RD1 comprises:

2 x 70ft. 14G copper or 140ft. stranded (as preferred)
1—AT Centre Piece
2—Ribbed Insulators
70ft. 300 ohm Ribbon Feeder
52/6 P. & P. 4/6

TYPE RD2 as above, but with:

12—FS 6" Ceramic Spreaders
140ft. Flexible Feedwire
£3 10s. P. & P. 4/6

TYPE RE3 comprises:

70ft. Copper Wire (stranded or solid)
1—T piece
2—Ribbed Insulators
50ft. of 75 ohm Balanced Twin
35s. P. & P. 3/6

NEW BOXED VALVES. 3/6 each, 4 for 10/- P. & P. 2/-.

Types 6N7GT, 6AB7, 6AC7, 6SK7, 6SF7, 6F7, 956, U10, MSP4, IU5, 6G6G, X22, 958A, 6SK7GT, 5Z3, 8D2, 8A1, 6N7, 84, 15D1, 15D2.

LARGE CERAMIC COIL FORMERS. 4 1/2" L. x 2 1/2" diam. Grooved and threaded 9 T.P.I. Ideal for linears, 12/6 each. P. & P. 1/6.

SHORT WAVE KITS. One valve 50/- only, phones, ant, and batts, 40/- extra if required. Ideal for Junior op.

ABSORPTION WAVEMETERS. New improved model, 3.00-35 mc/s. in 3 switched bands, 3.5, 7, 14, 21, 28 and model control bands marked. Complete with indicator bulb. A must for any Ham Shack, only 30/- P. & P. 2/6.

SEALED RELAYS. 12v. 105Ω Coil. Type B, 2 Pole, C.O. + 2 Pole Norm. on, 12/6. P. & P. 1/6.



The Widest Range in the Midlands

★ HIRE PURCHASE
★ PART EXCHANGE

CHAS. H. **YOUNG** LTD.

At your service G2AK, G3LAY, G3VFF

170-172 Corporation Street,

Please print your address. No C.O.D. under £1.

'phone 021-236 1635

Birmingham 4

N. W. ELECTRICS

52 GT. ANCOATS STREET
MANCHESTER 4

061-236 6276

G3MAX

BELLE VUE CONVENTION & EXHIBITION
Sunday April 27 1969

Static Display of

EDDYSTONE RECEIVERS AND COMPONENTS

Fully operational caravan display, using Eddystone Equipment

Six Transistor Receiver, £3. P.P. 4/6. 35 Mc/s., single frequency, xtal controlled. 5/2N384's RF Amp., Mixer, Oscillator, 2 stage IF Amplifier. 2N388 First Audio, Diode Det. Diode Limiter, 35-455 Mc/s. Miniature xtal. In metal box with each section screened. Complete with circuit, Superior construction. All tested before despatch.

Coaxial Relay. UHF type. Super quality. U.S.A. Make. "C" to "BNC" in operate. "C" to "C" at rest. 24 volt coil. With plugs (removed from cable), 37/6, post 2/6. New plugs, type "C" 5/- each. Ex equipment sockets "C", 2/- each. Plug and socket, 6/- pair. Post 1/-.

PL259 BRAND NEW. Plug and socket, 8/- pair. Post 1/-.

RF24. 20 to 30 Mc/s. Components as in RF25, 10/-, post 6/-.

RF25 Bandswitched Converter. 40 to 50 Mc/s. Pre-set frequency. Excellent component value. Contains: 15, 30pf Philips trimmers, ceramic switch, 1-pole 5-way, 3-bank, 3 $\frac{1}{2}$ x 1" ceramic formers, 3 SP61 valves, 2 $\frac{3}{4}$ " Aladdin formers, stand-offs, etc. The complete unit for 7/6. Postage 6/- unfortunately.

Coaxial Relays. 'Londex' 24v. D.C. 70 watts. RF at 200 Mc/s. Supplied with 3 plugs (ex-cable), 22/6, plus 2/6 postage.

We still have some items from previous adverts.

Business hours : 9 a.m.-6 p.m. Tuesday-Saturday
CLOSED ALL DAY MONDAY

Stamped addressed envelope please, for list and any inquiries.

G3SMI

You can depend on Shure quality MICROPHONES For amateur radio communications

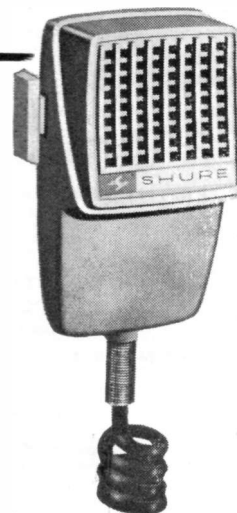
Shure Model 444 Controlled Magnetic Microphone

Specially designed for radio communications, giving optimum performance from single sideband transmitters as well as AM and FM units. Response cuts off sharply below 300 c/s and above 3,000 c/s, with a rising characteristic to 3,000 c/s. This results in optimum speech intelligibility and audio punch to cut through noise interference. High impedance. Dependable under all operating conditions. Complete with switch for instantaneous press-to-talk or VOX operation; finger-tip control bar; long-life switch; adjustable microphone height; sturdy, high-impact base and case; 7 ft. two-conductor shielded cable.



Shure Model 201 Diaphragm Type Ceramic Microphone

- *Provides clear, crisp, natural voice reproduction of high intelligibility
- *High impedance *Ideal voice response and omni-directional polar pickup characteristics
- *No humidity or temperature problems
- *Light, strong and compact
- *Heavy duty push-to-talk (non-locking) switch
- *Frequency response: 200 to 4,000 c/s
- *3-conductor retractable cable.



SHURE

Setting the
world's standard
in sound

SHURE ELECTRONICS LTD.

84 Blackfriars Road, London, S.E.1. Tel.; 01-928 3424

PETER SEYMOUR LIMITED

410 BEVERLEY ROAD, HULL, YORKSHIRE

Telephone: 41938

Wanted for cash, modern receivers. Please state your price

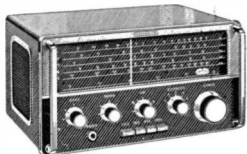
	£	s.	d.		£	s.	d.
EDDYSTONE 940	85	0	0	VOLSTATIC V.H.F. SKYMASTER, covers long, medium and 108-138 Mc/s. The best aircraft band portable in the U.K. (including carriage) ...	26	10	0
EDDYSTONE 770R	95	0	0	TRIO 9R59DE, 500 Kc/s.-30 Mc/s. Immediate delivery	39	15	0
EDDYSTONE 830/7	195	0	0	MULTIBAND DIPOLE TRAP SETS, with full instructions fully encapsulated, per pair 80-10 metres ...	2	10	0
EDDYSTONE 990R. 27-230 Mc/s. AM/FM, CW, fully transistorised, the latest model ...	295	0	0	TRIO JR500Se crystal-controlled Osc. tunable IF system, full coverage 80-10 metres. Amateur bands only. Two mechanical filters, transistorised VFO, etc. New ...	68	0	0
COLLINS, 75S3B	265	0	0	Full details of the Drake equipment are available on request.			
SWAN 400, complete with 230XC and 410VFO ...	195	0	0	SWAN 2 metre transverter, 240W PEP ...	155	0	0
KW 2000A, 4 weeks old	195	0	0	SHURE 201 microphones	5	10	0
LAFAYETTE HA350	49	0	0	LAFAYETTE PF60, all-transistor, battery/mains 152-174 Mc/s.	38	0	0
HACKET TRANSISTOR PORTABLE, LW plus 550 Kc/s.-30 Mc/s.	25	0	0	KW 2000A with A.C. P.S.U.	232	0	0
LAFAYETTE HA700	30	0	0	CODAR AT5 with P.S.U.	25	9	9
KW77	70	0	0	AR88 SPARES, logging dials 5/-; escutcheon (dial windows) 10/-; plus all tubes available.			
EDDYSTONE 2245A. 150-380 Kc/s., 510 Kc/s. to 1.5 megacycles and 3.7 to 30 megacycles, push/pull output, large modern dial. 110/240 A.C./D.C. ...	17	0	0				
KW VESPA with P.S.U.	135	0	0				

All items carriage free.

NOTE: Should you wish to part-exchange any good quality photographic equipment, our mail order camera department can quote you on trade-ins. We can also supply any new photographic equipment, and can take into stock items of Amateur Radio equipment, existing H.P. settled.

FULL H.P. FACILITIES ON EQUIPMENT OVER £35

ONE THIRD DEPOSIT UP TO 24 MONTHS TO PAY. LET US KNOW YOUR REQUIREMENTS



GEORGE FRANCIS G3TWV

FULL SERVICE FACILITIES ON KW, EDDYSTONE, SWAN, TRIO.

The same excellent service as given by us for last 11 years.

FRANCIS for EDDYSTONE

EB35	£66	13	4
EC10	£53	0	0
EA12	£195	0	0
830/7	£295	0	0

Diacast boxes and dials in stock.

FRANCIS for KW ELECTRONICS

KW2000A	£232	0	0
KW Vespa	£135	0	0
KW201	£110	0	0
New KW Atlanta	£250	0	0

FRANCIS for TRIO

9R-59DE	£37	15	0
JR500SE	£61	0	0
Matching Speaker	£4	7	6

FRANCIS for JOYSTICK

Standard	£4	15	0
De Luxe	£5	19	6
3A Tuner	£3	12	6
4 Tuner	£4	4	0

BRITISH MADE MORSE OSCILLATOR. Transistor, only needs Morse key and battery, 49/11; with pitch control and earphone socket, 59/11.

NO ORDER TOO SMALL

GOODS DISPATCHED BY RETURN, POSTAGE EXTRA

93 Balderton Gate, Newark, Notts.

Tel. 4733; after 6 p.m. 2578

Dialling Code 0636

FRANCIS for SHURE

201	£5	0	0
444	£10	0	0

FRANCIS for PARKAIR ELECTRONICS

Skybandit	£23	10	0
Concorde	£17	15	0
2 metre Tx	£80	0	0

FRANCIS for COAX CABLES

52 ohm, low loss	yd.	2	3
52 ohm, ordinary	yd.	1	10
75 ohm, ordinary	yd.	1	8
75 ohm, low loss	yd.	1	6
75 ohm, twin	yd.	6	6
300 ohm, twin	yd.	6	6
Egg Insulators	ea.	6	6

FRANCIS for SECOND-HAND

Labgear 160 Twin with P.S.U.	£25	0	0
KW Vanguard	£25	0	0
Eddystone 888A. S Meter and Speaker	£70	0	0
Eddystone EA12. Mint	£150	0	0
Mohican. Choice of two from	£25	0	0

★ THIS MONTH'S BARGAIN ★

EDDYSTONE 940

£70



SSB

TRIO's TS-510 Bring Ultimate Performance



TRIO's TS-510 is the definitive instrument especially engineered for complete "SSB ERA" function. It's a high power, high stability product of imaginative design that fully lives up to the renowned "TRIO" name. Extremely stable VFO, a new development that is built around 2 FET's and 13 transistors, guarantees stable QSO's during entire use, an accurate double-gear tuning mechanism and a linear tuning capacitor produce a 1 kHz direct reading on all bands. There's easy tuning in of SSB signals because the TS-510's frequency coverage has been compressed to 25 kHz for one complete rotation of the dial. Sharp cutoff for both reception and transmission is achieved by a sharp factor frequency filter built just

for this 510 series model. Combined with the TS-510's superb features are the distinctive, top quality PS-510 (Power supply and speaker) and VFO-5D (Variable frequency oscillator). With an AC power supply that operates a built-in 16 cm speaker, the PS-510 has been created as an exclusive companion instrument for the TS-510. It can be installed at any location with the PS-510 because the power supply is regulated on or off at the TS-510. The VFO-5D can match the TS-510 in performance and design. Its reading accuracy is unusually high since a double-gear dial covering 25 kHz per revolution is also used, as in the TS-510.



TO: B.H. Morris & Co., (Radio) Ltd. SW
Send me information on TRIO COMMUNICATION
RECEIVERS & name of nearest TRIO retailer.

NAME AGE

ADDRESS:

TRIO KENWOOD ELECTRONICS S.A. 160 Ave., Brugmann, Bruxelles 6, Belgium

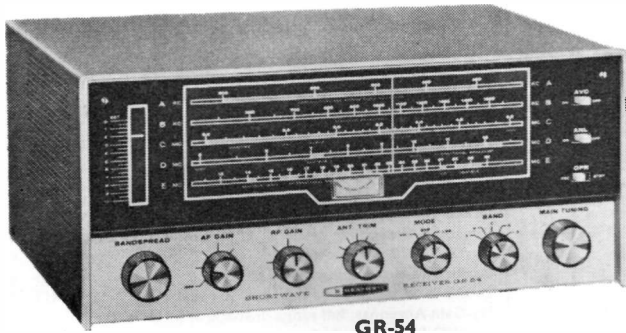
Sole Agent for the U.K. **B. H. MORRIS & CO., (RADIO) LTD.** 84/88, Nelson Street, Tower Hamlets, London E. 1, Phone: 01-790 4824

TECHNICAL
 LATEST
 PUBLICATIONS

	Post Free
ABC OF ANTENNAS (Foulsham).....	17s. 0d.
ABC OF TRANSISTORS (by G. B. Mann).....	21s. 0d.
AERIAL HANDBOOK by G. A. Briggs (2nd Edn.).....	15s. 9d.
AMATEUR RADIO DX HANDBOOK (by W9WNV).....	42s. 0d.
AMATEUR RADIO (by F. G. Rayer).....	26s. 6d.
AMATEUR RADIO ANTENNAS (by Hooton) Revised Edn.....	36s. 0d.
AMATEUR RADIO CIRCUITS BOOK.....	11s. 6d.
ANTENNA HANDBOOK Vol. 1, by K7GCO (Cowan Publication).....	33s. 6d.
ANTENNA ROUND-UP (by CQ) Vol. I.....	27s. 6d.
ANTENNA ROUND-UP (Vol. 2).....	33s. 6d.
ANTENNA HANDBOOK (A.R.R.L., 11th Edition).....	25s. 6d.
BASIC MATHEMATICS FOR RADIO AND ELECTRONICS.....	18s. 9d.
BEAM ANTENNA HANDBOOK, 3rd Edition.....	33s. 0d.
BETTER SHORT WAVE RECEPTION.....	27s. 6d.
CHART OF INTERNATIONAL FREQUENCY ALLOCATION—GENEVA (Official 10 Kc to 40 Gc), New Edition. 27in. x 16in. wide folding pages.....	35s. 6d.
CQ ANTHOLOGY (1952-1959).....	27s. 6d.
COURSE IN RADIO FUNDAMENTALS (A.R.R.L.).....	11s. 6d.
DICTIONARY OF ELECTRONICS (Penguin).....	8s. 6d.
ELECTRONIC CIRCUIT HANDBOOK Vol. I.....	27s. 6d.
ELECTRONIC CIRCUITS HANDBOOK Vol. II (Tom Kneitel).....	27s. 6d.
ELEMENTS OF RADIO ENGINEERING.....	16s. 0d.
FOUNDATIONS OF WIRELESS.....	23s. 0d.
GUIDE TO AMATEUR RADIO.....	6s. 8d.
GUIDE TO BROADCASTING STATIONS.....	6s. 9d.
HAM ANTENNA CONSTRUCTION PROJECTS.....	27s. 0d.
HAMS INTERPRETER.....	9s. 6d.
HANDBOOK OF HAM RADIO CIRCUITS (by W9CGA).....	28s. 6d.
HINTS AND KINKS Vol. 6.....	11s. 6d.
HOW TO BECOME A RADIO AMATEUR (A.R.R.L.).....	11s. 0d.
HOW TO IMPROVE SHORT WAVE RECEPTION.....	20s. 0d.
"HOW TO LISTEN TO THE WORLD".....	O/P
LEARNING MORSE (Iliffe).....	2s. 3d.
THE MORSE CODE FOR RADIO AMATEURS (R.S.G.B.).....	1s. 9d.
LEARNING THE RADIO TELEGRAPH (A.R.R.L.).....	4s. 6d.
MOBILE HANDBOOK (Published by CQ).....	27s. 0d.
MOBILE MANUAL (Published by A.R.R.L.).....	27s. 0d.
NEW RTTY HANDBOOK.....	35s. 0d.
NEW SIDEBAND HANDBOOK (by CQ).....	28s. 0d.
NOVICE HANDBOOK, Tx and Rx.....	25s. 0d.
OPERATING AN AMATEUR RADIO STATION (A.R.R.L.).....	2s. 8d.
QUAD ANTENNAE.....	28s. 6d.
RADIO AMATEUR EXAMINATION MANUAL.....	5s. 9d.
RADIO AMATEUR HANDBOOK (A.R.R.L.), 1968.....	25s. 0d. Special price!
RADIO AMATEUR OPERATOR'S HANDBOOK.....	6s. 6d.
RADIO AMATEUR CALL BOOK (1968/69).....	7s. 3d.
RADIO COMMUNICATION HANDBOOK (R.S.G.B.).....	69s. 0d.
RADIO DATA REFERENCE BOOK.....	14s. 0d.
RADIO HANDBOOK (Wm. I. Orr) (17th Edition).....	88s. 6d.
RADIO VALVE DATA (Iliffe).....	11s. 0d.
SERVICE VALVE AND SEMI-CONDUCTOR EQUIVALENTS (R.S.G.B.).....	5s. 6d.
SSB EQUIPMENT.....	3s. 4d.
S9 SIGNALS.....	9s. 6d.
SHORT WAVE LISTENING.....	13s. 5d.
SHORT WAVE RECEIVERS FOR THE BEGINNER (Data Pubs.).....	6s. 6d.
SHORT WAVE RADIO AND THE IONOSPHERE (Iliffe).....	11s. 9d.
SINGLE SIDEBAND FOR THE RADIO AMATEUR (A.R.R.L.) (4th Edition).....	26s. 6d.
SURPLUS SCHEMATICS (Published by CQ).....	23s. 6d.
SURPLUS CONVERSION HANDBOOK (including "Command Sets").....	26s. 6d.
TECHNICAL TOPICS FOR THE RADIO AMATEUR.....	10s. 8d.
TELEVISION EXPLAINED (Iliffe) (New Edition).....	26s. 6d.
TRANSISTOR RADIO HANDBOOK (Editors and Engineers).....	49s. 6d.
TRANSISTOR SUBSTITUTION HANDBOOK No. 8 (Foulsham).....	17s. 0d.
UNDERSTANDING AMATEUR RADIO.....	22s. 6d.
VHF HANDBOOK (Orr W6SAD).....	30s. 6d.
VHF MANUAL by A.R.R.L.....	25s. 0d.
VHF FOR THE RADIO AMATEUR (CQ).....	30s. 0d.
WORLD RADIO AND TV HANDBOOK, 1969.....	43s. 6d.

Available from **SHORT WAVE MAGAZINE**
 Publications Dept., 55 Victoria St., London S.W.1 · 01-222 5341
 (Counter Service, 9.30-5.15, Mon. to Fri.) (Nearest Station: St. James's Park)
 (GIRO A/C. No. 547 6151)

HEATHKIT for SW Listeners



**De-luxe 5 Band
Short Wave Receiver GR-54**
Kit K/GR-54 £50.0.0 P.P. 9/-
Ready-to-Use Price on request

● 5 bands . . . 3 shortwave bands cover 2 MHz to 30 MHz, plus 550 kHz to 1550 kHz AM broadcast band, and 180 kHz to 420 kHz aeronautical and radio navigation band ● Tuned RF stage for greater sensitivity ● Crystal filter for sharp selectivity ● Separate product detector for efficient SSB and CW reception ● Switchable upper or lower sideband mode position ● Built-in relative signal strength indicator ● Electrical bandspread tuning ● 6 tube—6 diode superhet

circuit plus 2 silicon diode rectifiers ● Built-in code practice monitor plus code key jack ● Automatic noise limiter, automatic volume control and antenna trimmer control ● "Velvet-touch" 16 revolution main tuning ● Built-in 4" x 6" PM speaker ● Built-in AM antenna plus external antenna terminals ● Standard jack accepts headphones or external speaker ● Safe transformer-operated power supply ● Sleek low-boy styling—Charcoal grey metal cabinet ● Antenna included.

Compare to sets costing very much more. Compare features like the crystal filter for extra-sharp selectivity . . . tuned RF stage for added amplification and image rejection . . . separate product detector for efficient SSB and CW listening, plus AM diode detector . . . switchable BFO control for upper and lower sideband tuning to eliminate "trial and error" SSB tuning . . . and complete controls for *all* functions.

Journey into the exciting world of shortwave with this low-cost 4 Band Receiver, GR-64

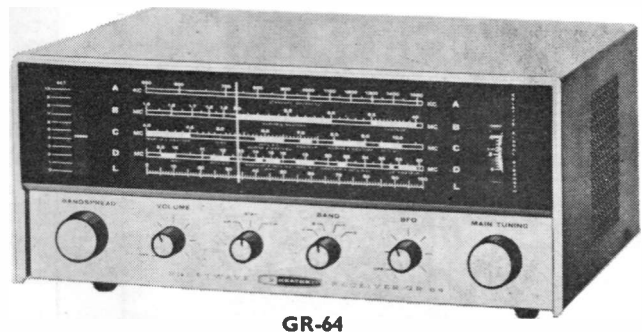
Kit K/GR-64 £22.8.0 P.P. 9/-
Ready-to-Use £29.8.0 P.P. 9/-

● 4 bands—3 shortwave bands cover 1 MHz to 30 MHz plus 550 kHz to 1620 kHz, AM broadcast band ● Built-in 5" permanent magnet speaker for a big, bold sound ● Illuminated 7" slide-rule dial with extra logging scale ● Easy to read lighted bandspread tuning dial for precise station selection ● Relative signal strength indicator aids pin-point station tuning ● 4-valve superhet circuit plus two silicon diode rectifiers ● Variable BFO control for code and SSB transmissions ● Built-in external antenna connections ● Built-in AM rod antenna ● Headphone jack for private listening.

World-wide reception on this low-cost receiver.

High performance features. A high voltage, transformer-operated power supply insures peak receiver efficiency. A BFO control "unscrambles" code transmissions. Smooth, accurate station selection. And electrical bandspread tuning separates frequencies to pin-point close-together stations. There's even a headphone jack for private listening. The back panel has terminals for an external antenna, a Q-multiplier input and a noise limiter on/off switch. And a relative signal strength meter aids tuning.

Modern "Low-Boy" styling. Includes a charcoal grey metal cabinet with black front panel and green and white band markings. Makes an ideal present for any youngster. Kit assembly is easy, too . . . with fast circuit board construction.



Improve your SW reception with a Heathkit Q Multiplier GD-125
Kit K/GD-125 £10.11.0 P.P. 5/-



DAYSTROM LTD, Dept. SW-4 GLOUCESTER

Enclosed is £.....post paid U.K.

Please send model(s).....

Please send FREE Heathkit Catalogue.

NAME

ADDRESS

Prices and specifications subject to change without notice.

SHOWROOM: Gloucester - Bristol Road

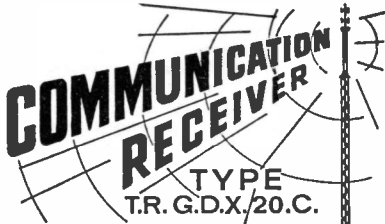


SHIPPING BAND RECEIVER

Hear shipping from all over the world. Covers the complete maritime, trawler and amateur bands. A neat little superhet. Attractive black crackle finish case approx. 6" x 5" x 5". Fully transistorised 9 volt battery fits inside. Speaker or headphone output. Brand new direct from makers. Comparable with sets being sold at 30 gns. Our Price only £9. Carriage and insurance 10/-, C.W.O. or C.O.D.

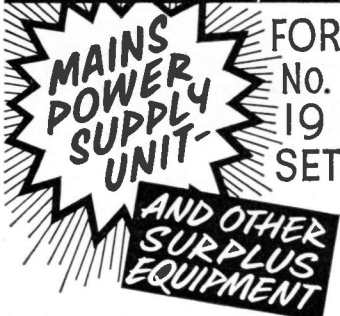
MORSE PRACTICE OSCILLATOR SET

Complete with "Hints on Learning Morse" manual. Fully transistorised. 19/6. P. and P. 3/6.



Brand new fully transistorised Communications Receiver. Specifications: 4, complete ranges 500 Kc/s. to 30 Mc/s., covering all amateur bands: shipping and trawler bands, and broadcast bands. A highly efficient double tuned superhet comprising R/F aerial tuning section, A.V.C. and built-in B.F.O. for C.V. or SSB reception. Operates from 9 volt battery provided that fits internally. Ideal for fixed or mobile reception. VHF speaker and headphone output. Hammer finished robust steel case of pleasing modern design. Size approx. 9" x 7" x 6". British manufacture. Due to huge purchasing we can offer these excellent receivers at less than half their normal worth. Complete with handbook. Now modified for improved performance. Price £16/10/-, Carriage 15/-.

PLUG-IN TX/RX



All units contained in an attractive Louvred steel case with full connectors, plugs and sockets and instructions.

RECEIVER SUPPLY UNITS ONLY. 200/250v. 50 c/s. input.
 19 set ... £3 10, carr. 10/- R.1132 ... £2 15, carr. 10/-
 H.R.O. ... £4, carr. 10/- R.1155 ... £3 15, carr. 10/-
 1475... ... £3 15, carr. 10/- PCR Receivers £3 15, carr. 10/-
 Units for most other types available on request.

19 SET TRANSMITTER PLUS RECEIVER POWER SUPPLY UNIT.
 Only £6 10, carr. 10/-.

AIRCRAFT/POLICE BAND RECEIVER

A small transistorised receiver that will receive civil aircraft and police fire/ambulance broadcasts. Operates from a 9 volt battery that fits internally. Robust metal cabinet size approx. 6" x 4" x 4". Attractive front panel. Speaker or headphones output. Price £8/10/-, Carriage 10/-. Few only. Brand new and unused.

MOVING COIL HEADPHONES AND MICROPHONES
 Brand new in maker's cartons, 25/-, P. and P. 5/-.

TRANS/RECIUEVE AIR/SEA/RESCUE TYPE

Must be dismantled or exported. Complete with mike/speaker aerial. Work up to 100 miles. Cost Govt. over £40 each. £2/10/- per set, 10/- P. and P. 2 sets £5, post free.

MINIATURE TRANSISTORISED B.F.O. UNIT

This is a miniature transistorised B.F.O. unit (tunable) that will enable your set to receive C.W. or S.S.B. reception. Compact. Single hole fixing. This small unit will fit anywhere. Size only 1 1/2" x 1 1/2" x 1 1/2". Complete with fitting instructions, 49/6, post free.

GLOBE SCIENTIFIC LTD Dept. SW20.
 24 CAWOODS YARD, MILL STREET, LEEDS, 9.

RADIO SHACK LTD.

LONDON'S AMATEUR RADIO STOCKISTS

Brand new equipment straight off the shelf

	£	s.	d.
KW 2000B transceiver and power supply ...	232	0	0
KW Atlanta transceiver and power supply/speaker...	250	0	0
KW Vespa 2 transmitter and power supply/speaker...	135	0	0
KW 201 receiver, built-in speaker and calibrator, p.s.u.	117	0	0
KW 1000 linear, built-in power supply ...	135	0	0
Swan 350C transceiver and power supply/speaker ...	295	0	0
Swan 500C transceiver and power supply/speaker ...	345	0	0
Drake TR-4 transceiver and power supply ...	357	10	0
Drake R4-B receiver ...	240	0	0
Drake T-4XB transmitter ...	250	0	0
Drake MN-4 matching network ...	55	0	0
Drake L-4B linear amplifier ...	415	0	0
Hy-Gain Antennas, full range in stock, send for details			
18 AVQ 5 band vertical ...	35	10	0
14 ABQ 4 band vertical ...	18	10	0
TH3Mk3 tri-band beam ...	67	10	0
TH3JR junior tri-band beam ...	41	0	0
CDR Rotator AR-10 for VHF antennas ...	18	0	0
CDR Rotator AR-22R for junior beams ...	25	0	0
CDR Rotator TR-44 for larger models ...	40	0	0
Mark Heliwhips mobile antennas, send for details.			
Mark HW-3 tri-band Heliwhip ...	12	10	0
Mark HW-10, HW-15, HW-420, 4 single band Heliwhips ...	6	10	0
Mark HW-20, HW-40, HW-80, 6' single band Heliwhips ...	7	0	0
Mark mobile mounts and springs also stocked.			
Copal 101 24 hr. digital clock, desk model ...	13	15	0
Copal 201 12 hr. digital clock, desk model ...	13	15	0
Copal 401 24 hr. digital clock, wall mounting ...	18	15	0
Copal 601 24 hr. digital clock, desk model ...	21	0	0
Koyo 1661 aircraft receiver ...	52	10	0
Radatec Mobile radar detector... ..	13	0	0

Used Equipment

Eddystone 770 R Straight from works recon. manual	175	0	0
Hallcrafters SX-117 receiver, immaculate ...	110	0	0
Hammarlund HX 500 transmitter, 10-80 CW, SSB, FSK ...	110	0	0
Hammarlund HQ 170-A receiver, 10-80, 6M, Calibrated for 2M ...	125	0	0
Eddystone S750 receiver, general coverage ...	40	0	0
Eddystone 680X receiver, immaculate ...	70	0	0
Sommerkamp RF 100B receiver with 160 metres ...	95	0	0
Sommerkamp FL 200B transmitter ...	110	0	0
Drake T-4X transmitter, hardly used ...	165	0	0
NCX-5 Mk. 2 transceiver, very good condition and p.s.u. ...	235	0	0
Heathkit RA-1 receiver... ..	30	0	0
Pye High band trunk mounting Ranger, high power, unmod. and control ...	11	10	0
Pye High band trunk mounting Ranger, low power, unmod. ...	6	10	0
Elizabethan (GSRV) 150W. transmitter and power supplies ...	10	10	0
AR88D in good condition ...	45	0	0

We have a beautiful Nautisport 330 inflatable boat and an Evinrude 9.5 outboard motor indistinguishable from new offered at the bargain price of £200. Radio gear taken in part exchange.

RADIO SHACK LTD.

182 BROADHURST GARDENS, LONDON, N.W.6

Tel. 01-624 7174

Cables: RADIOSHACK LONDON NW6

INDEX TO
ADVERTISERS

	PAGE
A.J.H. Electronics	127
Amateur Electronics (G3FIK)	66
Baginton Electronics	128
Belding & Bennett, Ltd.	127
BEQ Amateur Supplies	121
Burns Electronics	119
Carlton Hill Amateur Radio	128
Charles H. Young	60
Daystrom	71
Derwent Radio	124
Echelford Communications	74
Eley Electronics	119
George Francis	68
Giltex, Ltd.	55
Globe Scientific, Ltd.	72
G.W.M. Radio	74
Halson Electrical Services	127
Hamgear Electronics	121
Henry's Radio, Ltd.	121
Holdings Photo/Audio Centre	74
A. Imhof, Ltd.	123
J. B. Lowe	65
JXK Converters	123
K.W. Electronics ... <i>cover ii</i> ,	74
Minitenna Products	119
B. H. Morris & Co., Ltd. <i>front cover</i>	
Mosley Electronics <i>cover iii</i>	
Graham Newbery	125
N.W. Electrics	67
Peter Seymour	68, 120
Radio Shack, Ltd.	72
Rex Radio	128
R.T. & I. Electronics	124
Shure Electronics, Ltd.	67
Small Advertisements	120-127
Spacemark, Ltd.	121
S.S.B. Products	125
Stephens-James, Ltd.	126
Swanco Products, Ltd.	122
S.W.M. Publications <i>cover iii</i> ,	
<i>cover iv</i> , 70, 119, 120	
Taurus Electrical Services	128
The Amateur Radio Shop	119
Times Instrument Co.	126
Trio Corp.	69
VHF Communications	127
Western Electronics	119
Yukan	119

SHORT WAVE MAGAZINE

(GB3SWM)

Vol. XXVII

APRIL, 1969

No. 306

CONTENTS

	Page
"Clarry"— <i>An Appreciation</i>	75
Test Equipment For A Linear Amplifier, <i>by A. H. Dormer, M.I.E.R.E., G3DAH</i>	77
Looking at The Heathkit SB-310— <i>Review</i>	81
Top Band with the Trio JR-500S, <i>by E. Johnson, G2HR</i>	85
Design for a CW Transceiver, Part I, <i>by T. Harrison, GM3NHQ</i>	87
Pi-Tank Circuitry and Construction, <i>by F. G. Rayer, A.I.E.R.E., G3OGR</i>	91
Station Change-Over System, <i>by B. D. Simpson, G3PEK and C. Birkett, G3SMI</i>	94
Strange Fault on Twenty, <i>by J. MacIntosh, F.C.C.S., M.I.E.R.E., GM3IAA</i>	95
Communication and DX News, <i>by E. P. Essery, G3KFE</i>	97
VHF Bands, <i>by A. H. Dormer, G3DAH</i>	103
Sophisticated Car Alarm Circuit, <i>by N. E. A. Rush, G3HBZ</i>	109
The Month with The Clubs— <i>From Reports</i>	111
The Other Man's Station—G3WOB	117
New QTH's	118

Managing Editor: AUSTIN FORSYTH, O.B.E. (G6FO/G3SWM)

Advertising: Maria Greenwood

Published at 55 Victoria Street, London, S.W.1, on the last Friday of the month, dated the month following.
Telephone: ABBey 5341/2
(STD 01-222-5341)

Annual Subscription: Home: 45s. (48s. 1st class) post paid
Overseas: 45s. (\$6.00 U.S.), post free surface mail

Editorial Address: Short Wave Magazine, BUCKINGHAM, England

AUTHORS' MSS

Articles submitted for Editorial consideration must be typed double-spaced with wide margins on one side only of quarto or foolscap sheets, with diagrams shown separately. Photographs should be clearly identified on the back. Payment is made for all material used, and it is a condition of acceptance that full copyright passes to the Short Wave Magazine, Ltd., on publication.

© Short Wave Magazine Ltd.

You don't have to buy your Trio from Holdings of Blackburn. Swap your Hi-Fi or CAMERA for it.



TRIO 9R59-DE
£42. 10. 0 (carriage 10/-)

Free voltage stabiliser fitted★ Guaranteed after sales service. £1 extra and we will peak it on the ham bands (comes up S point or so). Personal service and H.P. terms.

Never heard of us? We are leading Hi-Fi and Photographic Dealers, but when we found out how good the Trio Rx was we had to stock it. Our G3LLL says it's the best he's seen at anything like the price. F.B. on S.S.B. even on 10 metres with additional stabiliser★

Mechanical filters, bandspread and fine performance, what more could you ask for £42. 10. 0, it would be good value at £60. Call for a dem. or order with confidence.

ALL HI-FI AND PHOTOGRAPHIC REQUIREMENTS

HOLDINGS PHOTO/AUDIO CENTRE

39/41, MINCING LANE, BLACKBURN
Tel. 59595/6 Closed Thursday

Echelford Communications

32 FELTHAM HILL ROAD, ASHFORD, MIDDX

Ashford (MX) 55265 up to 9.30 any evening

April sees the Mobile Rally season with us once again, and we shall be attending many in the forthcoming months. The "we" will be G3RHF, G3SZG, G3UFM, G3YCO plus a YL or XYL. A list of the rallies we shall be seen at for the coming month will be published each month. This month sees us at the NORTH MIDLANDS RALLY, DRAYTON PARK, TAMWORTH, STAFFS on APRIL 20—will you be there? Amongst many items you will be able to relieve us of, as you can now either via the shop or the GPO (please add postage where requested) includes:—

	£	s.	d.
HALSON MOBILE WHIPS , complete with 1 coil (5/-)	6	17	6
Extra coils for 160, 80, 40, 20 (2/6)	3	17	6
Base only (2/6)	1	5	0
CODAR T28 RECEIVERS , ideal for Mobile use, 12-15V. D.C. powered (5/-)	15	17	6
J-BEAMS mainly 2M types are ex-stock plus mast fittings, etc.			
CHANNELMASTER ROTATORS (Post free)	14	0	0
Call-sign Plaques , ½" high letters, white on black 5 characters with clip (Post free)	3	6	
Additional characters			5
QSL Cards : 250 25/-, 500 45/-, 1000 70/- S.A.E. for samples.			
DENCO AND RAPANCO COILS, JACKSON CAPACITORS , etc.			
SECOND-HAND ITEMS			
HEATHKIT DX40 with Xtals and American HG10 VFO	37	10	0
LAFAYETTE HE 40 receivers from	15	0	0
MINIMITTER "Mercury" transmitter, big brute	27	10	0
LAFAYETTE "Starlight" Tx. No xtals or VFO. Mint condition	26	0	0
JXK SATELLITE CONVERTER . IF 28/30 MHz ...	10	0	0
CAMBRIDGE . Sub-standard Laboratory voltmeter 5 ranges	45	0	0

All items carriage extra

WANTED: Full-time assistant, keen and preferably licensed, 40 hour week. CLOSED ALL DAY WEDNESDAY.

ALAN WHEELER, G3RHF

G. W. M. RADIO LTD.

RECEIVERS

VALVES. New. 807 and 5U4, 6/- each, post paid. 6 for 23/-, post paid. 813, used, filaments tested, 15/-, post paid.

UNIRADIO 78 CO-AX fittings. Plug, socket and chassis socket, plug and socket fit ½" dia co-ax, 3 quality items for 10/-

WAVEMETER CLASS "D" No. 2. Mains operated. As new £12/10/-, carriage paid. Crystal Calibrators No. 10, 55/-, post paid.

TELESCOPIC MASTS. 34ft. complete with base, guy ropes and pickets. 7ft. collapsed, £6/10/-, carriage paid.

METERS. New. Round 2½" hole, 500 ma. Square Moving Iron 100 volts or Moving Coil 5 ma calibrated 0-400 Amps, 15/- each, post paid.

AR88 for callers only, from £35.

RI475. 2-20 Mc/s. Large slow motion dial, etc. with original power unit for 12 volts D.C. or 230 volts A.C. Less connecting cable, all connections marked. £11, carriage £1.

HARTLEY DOUBLE BEAM OSCILLOSCOPE TYPE 13A. Time base 2 c/s. to 750 Kc/s., Y amp response to 2 Mc/s., complete with leads and probe unit, £20, carriage £11/10/-.

FIELD TELEPHONES. Type "F," tested and working, £5, pair post 10/-.

AERIAL VARIOMETER TUNERS for 19 set, 15/-, post paid.

POWER UNITS ZA46961 No. 12, 12 volts D.C. for C42 Tx/Rx, £5, carriage 12/6.

VALVE VOLTMETERS CT54. 0-480 volts A.C. or D.C. up to 200 Mc/s. in 6 ranges. 0-10 Megohms in 5 ranges. Battery operated 2 x 1.5, 75 and 15 volts (not supplied) £5, carriage 15/- in good clean condition.

SIEBE GORMAN underwater torches, 50/-, post paid.

HEADSETS for 19 or 22 set with microphones, used 10/-, new 15/-, post paid.

LIGHTWEIGHT MASTS. 10 x 3ft. screw-in sections plus 14ft. collapsible whip insulator, which can be fitted at base or top of 30ft. sections (i.e. 14ft. whip 30ft. high or 44ft. vertical) set of guy ropes, pickets and ground spike, 65/-, carriage paid. Packed measures 3' 6" x 7" dia. in canvas case.

RACAL RA17. Aerial trimmer capacitors 220pf, 5/-, post paid.

All equipment offered is complete but not tested unless otherwise stated. Carriage charges quoted are for England and Wales only.

Telephone 9097

Terms: Cash with order. Early closing Wednesday.

40-42 PORTLAND ROAD, WORTHING, SUSSEX

K.W. Communications Ltd.

A selection of imported items now in stock:

SWAN 500C with 230XC P.S.U.	£328
SOMMERKAMP FR-500 DX	£130
DRAKE TR4 with AC4 P.S.U.	£354
DAVCO DR30 Transistorised Receiver	£175
S.B.E. SB2LA Linear Amplifier	£134
TRIO TS500 Transceiver with VFO5 and PS500 P.S.U.	£228
CDR AR10 VHF/UHF Rotators	£18
CDR TR44 Senior Beam Rotators	£40
CDR HAM—"M"	£70
CDR AR22R Junior Beam Rotators	£25
HY-GAIN Vertical Antennas	} Send for details
HY-GAIN Tri-band and Monoband Beams	

SECOND-HAND IMPORTS (All As New).

SWAN 500 with 230XC P.S.U.	£260
COLLINS 75-S-3B Receiver	£285
NATIONAL HRO500 5 Kc/s-30 Mc/s	£500

HAMMARLUND, TRIO, SOMMERKAMP,
obtained to order.

1A Heath Street, Dartford, Kent
Dartford 25574

The SHORT-WAVE Magazine

“CLARRY”

An Appreciation

The passing, on March 7 last, of an old friend of Amateur Radio and for many years one of its most devoted servants, came as a sad shock to a very large number of people.

John Clarricoats died in his 72nd year, after a long and full life spent first as a junior in industry, then as General Secretary of the Radio Society of Great Britain—a post he held for nearly 40 years—and latterly, after retirement from the RSGB, as a leader in local public affairs. He threw himself heart and soul into everything he undertook and literally died in harness—at the time of his passing he was Mayor of the London Borough of Enfield, in its way one of the most important of the mayoral offices in the GLC area.

But it will be for his work for the RSGB that “Clarry” will be best remembered in our world of Amateur Radio. Not only was he General Secretary and Editor of the *RSGB Bulletin* but he was directly responsible for building up the Society in the pre-war period, during which time he had almost unfettered control. When the War came in 1939, because of the danger of total loss through bombing and in order to save the Society much expense, it was his idea to take the RSGB archives to the comparative safety of his home in North London. From there, with the assistance only of Miss May Gadsden, he kept the Society going and published an attenuated *Bulletin*.

With the resumption of amateur activity in 1946 and the move to the Ruskin House office, membership began



*Alderman John Clarricoats, O.B.E., J.P., (G6CL),
Mayor of the London Borough of Enfield.*

(Died March 7, 1969, in his 72nd year)

to increase rapidly and the RSGB became a much bigger job than ever it had been. It was during these early post-war years that John Clarricoats started to become so closely identified with the international aspects of Amateur Radio, travelling to many parts of the world to attend conferences—and, more particularly, to reinforce the efforts of those concerned with keeping the amateurs' share of the spectrum.

By 1958, he had been elected honorary secretary of the Region I bureau of the International Amateur Radio Union, which covers the whole European area. His knowledge of Amateur Radio and his vast administrative experience, gathered during his years in the key executive job with the RSGB, gave him a standing of unquestioned authority in all these matters—allied to which he knew, and was known to, practically everyone of any consequence on the official side at the many Radio Conferences he attended.

As such a strong personality with so much enthusiasm for getting matters round to his own way of thinking in RSGB affairs, he did not always endear himself to all his colleagues. There came the time, in December 1963, when he retired from the service of the Society, at the age of 65.

But this retirement in no way inhibited his activities in the sphere of Amateur Radio politics and administration—he carried on as Secretary of Region I of the I.A.R.U. and, apart from the committee work, compiled and edited its own regular *Bulletin*.

* * *

Even while with the RSGB, Jack (as he was always known to his more intimate friends) had been taking an active interest in the politics of his local borough of Southgate, becoming its mayor for the year 1955-'56. It was during this period that he was gazetted O.B.E., in recognition of his public work. On retirement, and with the formation of the Greater London Council, he became

more involved in local affairs and eventually was elected Mayor of Enfield.

His interests did not end with town-hall politics. He was very keen on sport, was a member of the M.C.C. and of the Middlesex and Surrey County Cricket Clubs. He was deeply interested in the realities of Further Education, and as a governor of the Enfield and Southgate Technical Colleges, played an important part in their affairs. As a Freemason he held L.G.R. and as the founder of Lodge No. 8040, he was its first master and latterly its secretary, a responsibility to which he devoted himself with all his customary ability and enthusiasm. He was also honorary secretary of the Radio Amateur Old Timers' Association, a fraternal body which now has a membership of 230.

In the realm of authorship, he produced *World at Their Fingertips*, a history of Amateur Radio in the U.K., taken from the earliest days to the present time—and he was, of course, the author of much original material in his various administrative capacities in the radio amateur context.

Though he had held his callsign G6CL since the mid-1920's, he was neither highly technical in the strict sense nor ever very active on the air after becoming the RSGB's first full-time official. His *forte* was administration and his interest the development of the Society as an organisation standing on its own feet.

* * *

A memorial service was held for John Clarricoats at his own church—Christ Church, Southgate—on March 14. It was attended by a large and representative gathering, reflecting not only his importance as a local man of public affairs and many interests, but his wide-ranging Amateur Radio activities as well. Many of these friends came considerable distances to pay their last respects to one who in his own way had made such a significant individual contribution to the well-being of Amateur Radio.

A.J.F.

TEST EQUIPMENT FOR A LINEAR AMPLIFIER

TWO-TONE OSCILLATOR AND OSCILLOSCOPE—BASICALLY SIMPLE DESIGN FOR PRACTICAL WORK

A. H. DORMER, M.I.E.R.E. (G3DAH)

THE operation of a linear amplifier at G3DAH called for the acquisition of additional items of test equipment for setting-up purposes, notably a two-tone oscillator and a small monitor oscilloscope. The station 'scope, a large double beam job, was not only too bulky to mount conveniently close to the linear, but was also required for other purposes, so it was decided to start from scratch and build something compact which could be left *in situ* near the amplifier to provide continuous monitoring facilities. Since the oscilloscope was in any case going to need a mains power supply, it was decided that both units should be valved and should be constructed from components available in the junk box. A search revealed a VCR-139A CRT and several EF50's, and from there on the rest was straightforward.

Two-Tone Oscillator

For single-frequency working in the audio range, the phase shift oscillator is a natural; few parts are required and several volts of distortionless *sine* wave output are readily available. The circuit used is shown in Fig. 1, p.78. V1 and V2 operate as amplifiers with phase-shifting networks connected in a feedback loop between their anodes and grids. In order to maintain oscillation, the phase shift required in the CR networks is 180°, since there is already an inherent 180° shift between grid and anode within the valve and the feedback is then in phase with the input at a frequency determined by the CR values. The amplification of the stage must be greater than unity for oscillations to be started and maintained.

A 90° phase shift cannot be obtained from a single CR network, and three or more are required. In this case, the constants are chosen so that the required result is achieved with three sections only, each providing 60% of phase shift, and the oscillators produce frequencies of approximately 1.2 kc and 2.0 kc. Although these are not critical, they should not be harmonically related and should provide a difference-frequency within the audio passband of the SSB filters. For those who wish to use other frequencies, the formula for calculating the output from a three-element network is:

$$f = \frac{\sqrt{6}}{2\pi RC} \text{ and the required amplification}$$

is 5.

With four meshes,

$$f = \frac{\sqrt{\frac{10}{7}}}{2\pi RC} \text{ and the required gain is 18.2.}$$

The cumulative build-up of oscillation is limited by the valve amplification, and occurs at one frequency only. Harmonic output is small, since multiples of f are only phase shifted by a small amount and suffer little attenuation in passing through the CR network, so that the feedback at harmonic frequencies becomes negative and output, other than at the fundamental, is reduced.

Turning to Fig. 1, the outputs from the two oscillators are fed via 47 $\mu\mu\text{F}$ capacitors C7, C8, to the top end of R8, and a check with a VTVM or 'scope on the anode side of these capacitors enables the two outputs to be set to identical levels by adjustment of VR1. Four volts of audio are available at the junction of these capacitors and R8, and one volt at the top of VR2, the output control. Final setting-up should be performed by observing the output on a 'scope and adjusting VR1 to give an undistorted sine wave output at the operating frequency. Frequencies can be varied over small limits by making R3 or R13 variable. Voltages at various points in the circuit are shown on the diagram.

Construction is quite straightforward and follows normal audio practice. The chassis measures 6in. x 4in. x 2½in. deep, and Figs. 2 and 3 show the general layout. Screened cable should be used between the two oscillators and the output control.

Monitor Oscilloscope

First thoughts on the design of this piece of test equipment were directed towards simplicity and

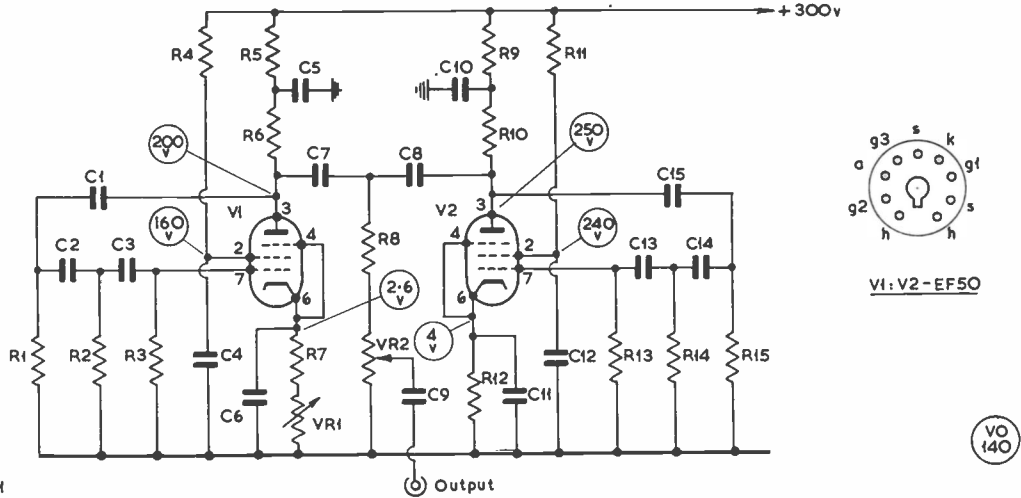


Fig. 1

Table of Values

Fig. 1. Circuit of Two-Tone Oscillator

Above, Fig. 1, circuit of the two-tone oscillator.
Below, Figs. 2 and 3, layout of the oscillator,
and tag-board arrangement.

C1, C2, C3, C13, C14, C15 = 1,000 μ F, 350v. wkng.	R4, R11 = 270,000 ohms 1w. R5, R6, R9, R10 = 39,000 ohms, 1w. R13, R14, R15 = 39,000 ohms, $\frac{1}{2}$ w.
C4, C12 = 8 μ F, 350v. wkng.	R7 = 470 ohms, $\frac{1}{2}$ w.
C5, C10 = 16 μ F, 425v. wkng.	R8 = 330,000 ohms, $\frac{1}{2}$ w.
C6, C11 = 100 μ F, 15v. wkng.	R12 = 1,800 ohms, $\frac{1}{2}$ w.
C7, C8 = 47 μ F, ceramic	R13, R14, R15 = 39,000 ohms, $\frac{1}{2}$ w.
C9 = .01 μ F, 15v. wkng.	VR1 = 500 ohms, ww.
R1, R2, R3 = 22,000 ohms, $\frac{1}{2}$ w.	VR2 = 100,000 ohms, $\frac{1}{2}$ w.
	V1, V2 = EF50.

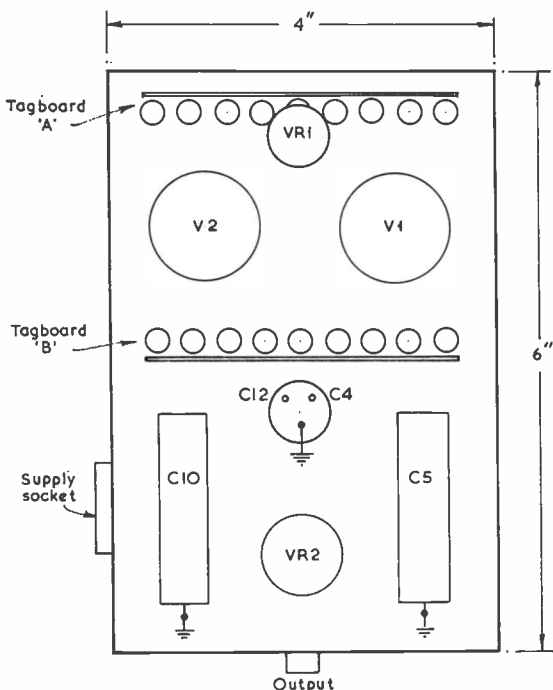


Fig. 2

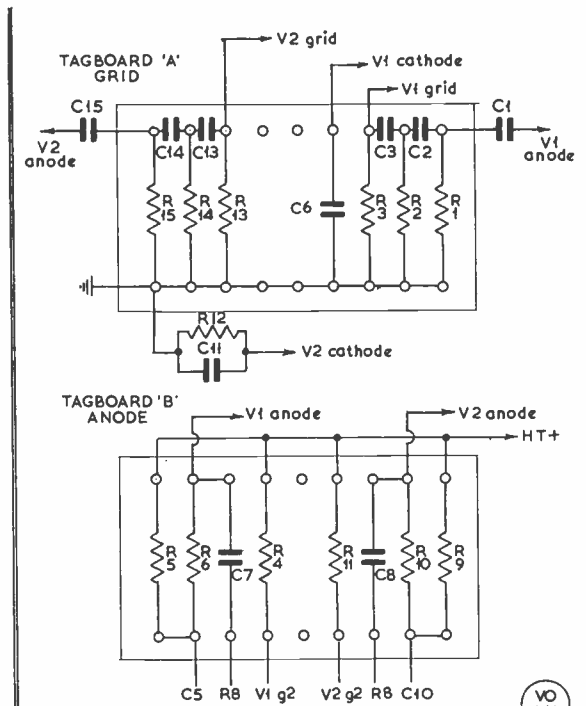


Fig. 3

VO
140

VO
141

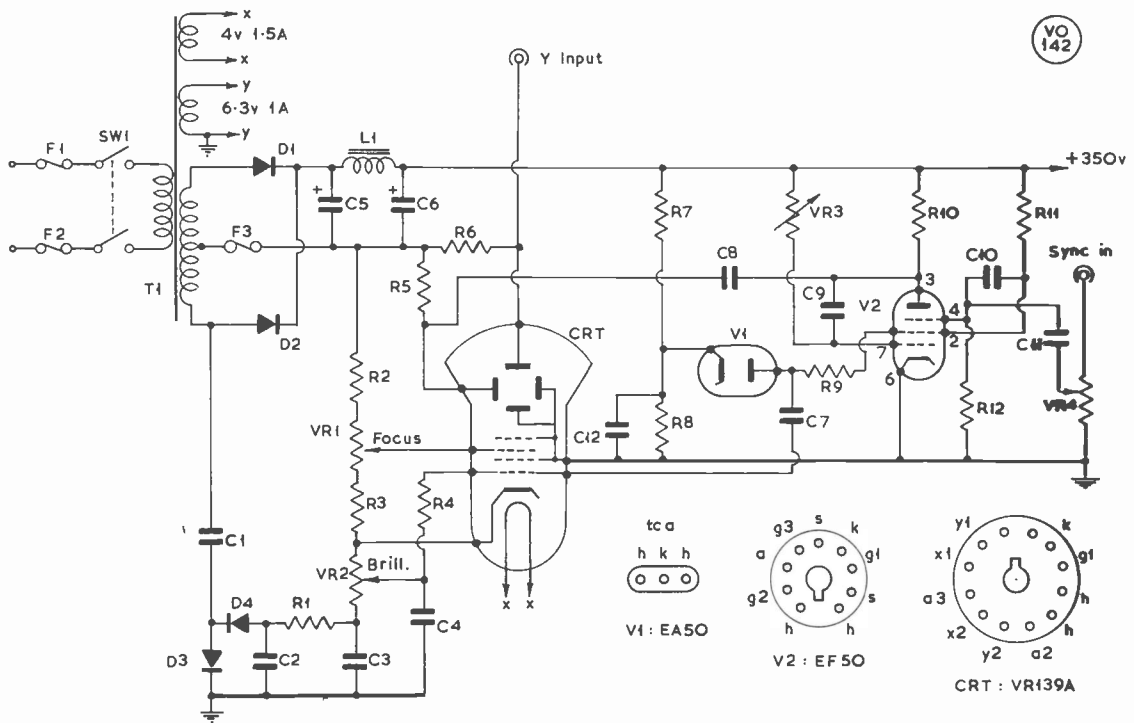


Fig. 4. Circuit of the Monitor Oscilloscope.

compactness and so the mock-up model used the mains voltage to provide the horizontal sweep. Although sufficient timebase amplitude could be obtained by this method, there were several disadvantages inherent in the system. First, there was an obvious flyback trace which made the interpretation of the displayed pattern difficult; secondly, there was no control over the speed of the timebase and, thirdly, synchronisation at frequencies other than 50 c.p.s., and multiples thereof, could not be achieved. These considerations led to the conclusion that a separate timebase was required even though this added to the size and complexity of the final product, albeit in very small degree.

A fairly obvious starter was the Miller Transatron timebase, and the EF50 lends itself admirably to this application. The circuit is shown in Fig. 4. A detailed explanation of its functioning is rather cumbersome and may be found in the technical literature. Suffice it to say that a linear sawtooth waveform is available at the anode of V2 and a square wave at the screen grid. The timebase can be either self-running or triggered. With the values chosen the timebase will free-run between 40 c.p.s. and just over 1000 c.p.s., which is adequate for the display of speech, tone and output waveforms. The synchronised range is slightly less than this. At the highest timebase speeds, the

Table of Values

Fig. 4 Monitor Oscilloscope

C1, C2,	R4, R5,
C3 = .25 μ F, 1,000v.	R6, R9 = 1 mehozm, $\frac{1}{2}$ w.
wkng.	R10, R11 = 47,000 ohms, 1w.
C4 = 1 μ F, 1,000v.	VR1 = 500,000 ohms,
wkng.	ww.
C5, C6 = 16 μ F, 450v.	VR2 = 100,000 ohms,
wkng.	ww.
C7 = .1 μ F, 1,000v.	VR3 = 5 megohm, Lin.
wkng.	VR4 = 1 megohm, Lin.
C8 = .05 μ F, 350v.	D1, D2,
wkng.	D3, D4 = BY100
C9, C11 = .01 μ F, 350v.	L1 = 10 Hy, 20mA
wkng.	T1 = 350-0-350v. 20
C10 = .005 μ F, 350v.	mA, 4v. 1-5A,
wkng.	6-3v. 1A.
R1 = 10,000 ohms, $\frac{1}{2}$ w.	F1, F2 = 1 amp.
R2 = 500,000 ohms, 1w.	F3 = 50 mA
R3, R7,	VCR1 = VCR-139A
R8, R12 = 100,000 ohms, 1w.	V1 = EA50
	V2 = EF50

flyback trace was still visible, and so the square wave at G2 was used to provide trace bright-up during the forward stroke, after limiting by diode V1 to produce a clean top of correct amplitude. If this is not done it will be found that the trace brightness is uneven and/or the brightness control range is incorrect. External synchronisation may be applied to G3, the suppressor grid, for example from the two-tone oscillator, but with RF from the transmitter applied directly to the Y plate this may

not be found necessary. An alternative is to connect the Y plate directly to the top of the sync. control potentiometer, although this will reduce the amplitude of the display. It was not found necessary to include horizontal and vertical shift controls to centre the display.

The common HT supply for this valve and for the two-tone oscillator follows standard practice. In view of the close spacing within the CRT of the heater and cathode, these two electrodes are sometimes seen connected together. If this is done the 4v. heater winding on the mains transformer must be insulated from the frame and other windings to the full value of the EHT voltage (in this case some 700 volts) or a separate transformer employed. The CRT used in this design has adequate cathode/heater insulation and special precautions are not therefore required, enabling a standard mains transformer to be used, but consideration should be given to this aspect if other types are substituted.

Voltage for the CRT electrodes is obtained from a conventional voltage doubler circuit across half the transformer secondary. BY-100's were used here since they were available, but any 800 volt p.i.v. diodes would serve. It would have been possible to use the whole of the secondary winding and a single half-wave rectifier, but this would have called for more smoothing and decoupling, and higher voltage diodes. The Brightness and Focus controls are at high potential above ground and should be adequately insulated and protected from the unwary finger. It should be possible to use the 3BP1 CRT in this design, although it is a little less sensitive and the EHT chain values might need some modification.

No constructional details are given since these can be varied to suit the requirement of the user. Points to watch are that a metal screen round the CRT is a *must*, and that it may be advantageous to have a separate power supply chassis. If this is not done, the mains transformer and smoothing choke must be placed to the rear of the CRT and screened from it in order that the field from them shall not affect the display. Operating voltages are shown on the circuit diagram.

Operation

Operation of the equipment described is simplicity itself. The oscillator is connected to the microphone input of the SSB prime mover, taking care to avoid overload of the mic. input circuits, and the Y plate of the oscilloscope to a single turn link near the output circuit of the linear amplifier. If preferred, capacity coupling can be used by winding a few turns of insulated wire round the spigot of the transmitter output socket and connecting this to a separate coaxial receptacle. The linear amplifier drive, loading and tuning controls are then adjusted to give the maximum undistorted output under correct operating potentials. Although the two-tone test cannot provide a quantitative measure of the amount of distortion present in the

output of the linear, it can give a visual indication of incorrect operating conditions, notably grid bias and loading, and as such, is a *sine qua non* as far as the writer is concerned, who does not believe that it is possible to set up a linear correctly without an oscillator and oscilloscope.

It should be remembered that the linear amplifier must never be driven to full output under these conditions, but only to the limits specified by the manufacturers of the valve type used. If these are not available, a rough guide is to limit the anode current with a two-tone input to 70% of the maximum permitted for single-tone operation.

The applicability of this simple test apparatus to checks on modulators and amplifiers used in AM transmissions is obvious. The addition of a single-valve amplifier operating at the Rx IF will also enable the waveforms of incoming signals to be observed.

SPECIALLY ON THE AIR

Organisers wishing for appearance in this space (which is free) should send in their notice—on a *separate sheet*, please, headed "Specially on the Air"—set out in the form shown below. Please *do not* run these requests in with letters on other subjects, or reports for regular features. Insertions proposed for "Specially on The Air"—and we must have the name/QTH of the responsible contact man—should be addressed: Editor, SHORT WAVE MAGAZINE, BUCKINGHAM.

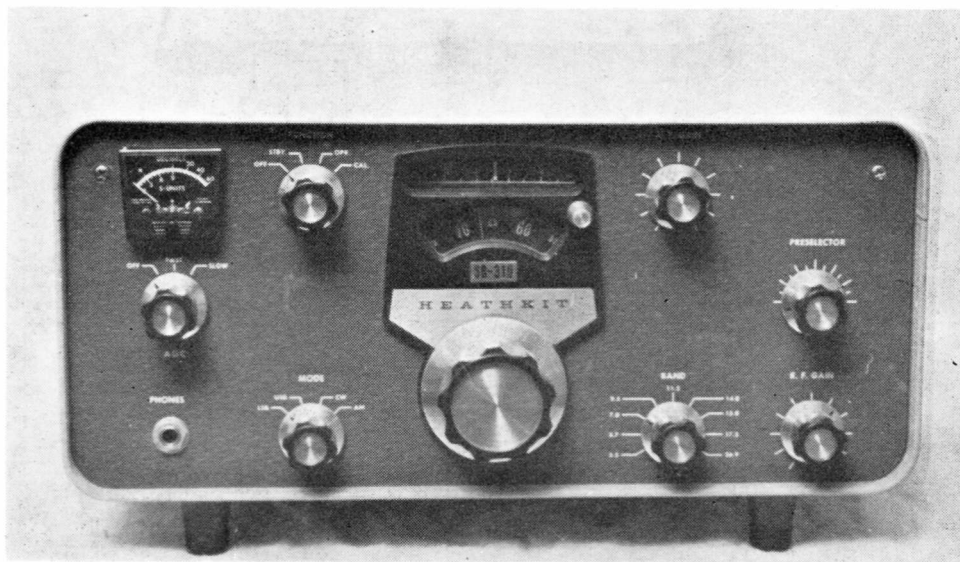
GB2BVC, April 27: Talk-in station, on 160m. and two metres, in conjunction with the Northern Radio Societies Association annual convention at Belle Vue, Manchester. R. M. Clarke, G8AYD, *QTHR*.

GB3NS, May 2-3: For the Newark & Nottinghamshire Agricultural Show, one of the largest of its kind in the country, when it is hoped to be operating AM/CW/SSB on all bands 10 to 160 metres. R. Wallwork, G3PAW, Magnus Grammar School, Newark-on-Trent, Notts. The station is being put on by the School, at the invitation of the County Education Authority.

GB3BEK, May 3-4: For the 700th anniversary celebrations of the Beaconsfield Charter Fair, organised by the local group, to work AM/SSB on the 10-160m. bands, and AM on 4 metres. D. C. Chapman, G3NGK, 64 Heath Road, Holtspur, Beaconsfield, Bucks.

GB3YMC/A, June 1: At the "Y" Sports Centre, Melrose Close, Loose, Maidstone in connection with their Mobile Rally on that day, and as part of the YMCA Anniversary Celebration. QSL's *via* W. E. Kent, G3YCN, 72 Bower Mount Road, Maidstone, Kent.

GB3FC, June 5-7: Station to be provided by staff members in connection with the Forestry Commission exhibition in Bush Estate, Edinburgh, for the 15-20-80-160m. bands. A special QSL card will be issued for all contacts and reports. Organiser: W. A. Lindsay-Smith, G3WNI, 22 Kingswood Crescent, Copthorne, Shrewsbury.



LOOKING AT THE HEATHKIT SB-310

REVIEW OF A SPECIALISED RECEIVER OF CONSIDERABLE SWL INTEREST

THIS receiver may be described as the BC and SWL version of the Heath SB-Line series of equipments. It covers nine 500 kc segments, including amateur bands at 3.5, 7 and 14 mc, plus bands starting at 5.7, 9.5, 11.5, 15, 17.5 and 26.9 mc, the latter taking in the U.S. Citizens' Band. This ensures coverage of the most popular broadcast bands, and also the standard-frequency transmissions at 10 and 15 mc.

The receiver is supplied complete with a mains lead having the receiver-end connector moulded to it, a copy of the *World Radio-TV Handbook* and, of course, the excellent construction manual. As the sample receiver was supplied ready built, tested and aligned, attention was first given to this manual, in an attempt to assess the difficulty or otherwise of home-constructing a kit receiver and aligning it. The conclusion reached after a close study was that such a kit would be no bother at all, provided the instructions were followed to the letter; the total time to completion should be in the neighbourhood of 40 hours or so.

Because of the circuitry used, alignment would be expected to be relatively simple, and indeed quite a lot easier than the alignment of a conventional tunable first oscillator type of receiver, such as the HRO. A valve voltmeter of 11-megohm input impedance is required to tune up the crystal oscillator on each band, as a first step. This having been done

for all bands, the RF and IF alignment can be carried out using only the 100 kc calibrator in the receiver—although instructions are given for an alternative method by aid of a signal generator, in the conventional way. The calibrator itself can be checked against the WWV signal at 15 mc.

Performance Specification

Pretty good, and pretty well met. Stability is very good; if the receiver has been on a few minutes and a signal drifts, you can be sure it is the other chap! Incidentally, the drift during the warm-up period fell within the limits quoted for normal after-warm-up conditions.

AGC performance is extremely good. The receiver was used in conjunction with a K.W. Vespa transmitter on 40-metre CW, with no arrangements for muting whatever other than the aerial switching from "transmit" to "receive." On fast AGC, the result was just that the S-meter banged over to S9 + 60 dB, but the signal coming out of the headphones when transmitting was crisp and clear with no signs of blocking, while the return to receiving sensitivity was quicker than any normal CW operator would need. The AGC-slow position gave a similar result, although recovery was considerably slower. With the AGC off, the receiver could not be truly said to be blocked, although the outgoing signal was rendered

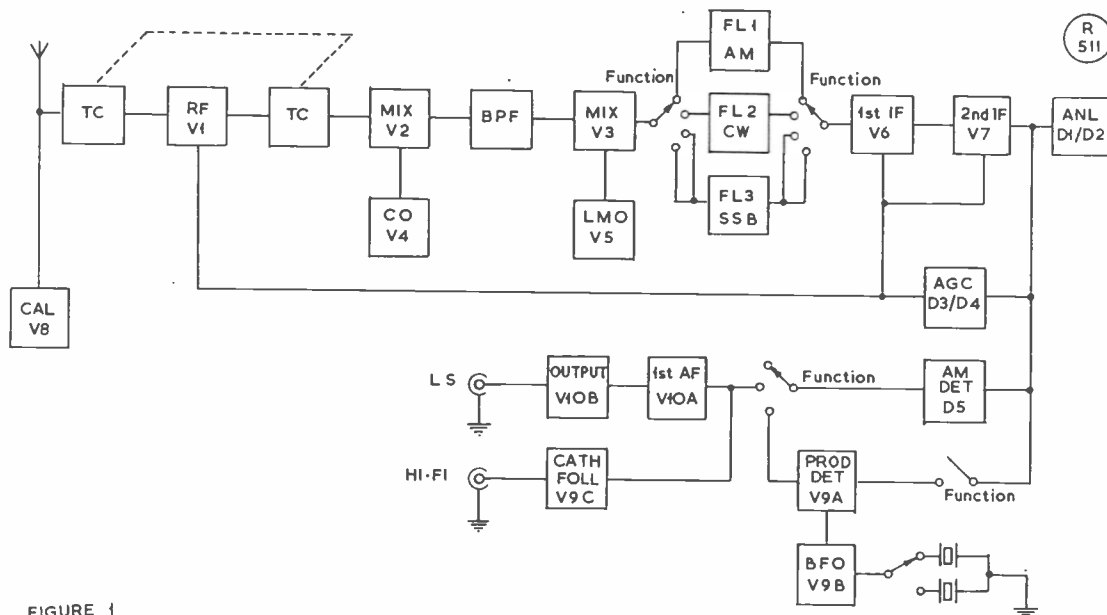


FIGURE 1

Fig. 1. Block schematic of the Heathkit SB-310 receiver, showing only basic function switching. Valve line-up is: V1, 6BZ6; V2, V3, V8, 6AU6; V4, 6AB4; V5, for LMO stage, 6CB6; V6, V7, 6BA6; V9, 6AV11, triple triode; and V10, 6HF8. Only the 6AV11 is likely to be a spares problem in the foreseeable future and this will, of course, be available from Daystrom, Ltd. In the case of failure of V5, it would need to be replaced by one of similar manufacture.

mushy and clicky; one could still read one's own Morse. On the other hand, tuning around for a really weak signal with AGC off, and then switching in the AGC did not result in any loss of the signals on CW or SSB, demonstrating that the AGC does not have that irritating habit of being unusable on SSB or CW, so common in older receivers with IF-derived AGC.

The noise-limiter was found to be quite good for such a simple circuit, although it did tend to cause a little distortion on strong signals, just as the handbook said it would—but since the noise limiter is not really needed on strong signals anyway, what matter? In any case, the better the selectivity of a receiver the more one feels the need for a separate IF strip of wide bandwidth so as not to distort and lengthen the noise pulses and nullify the usefulness of a conventional limiter—and the selectivity of this receiver is first-class.

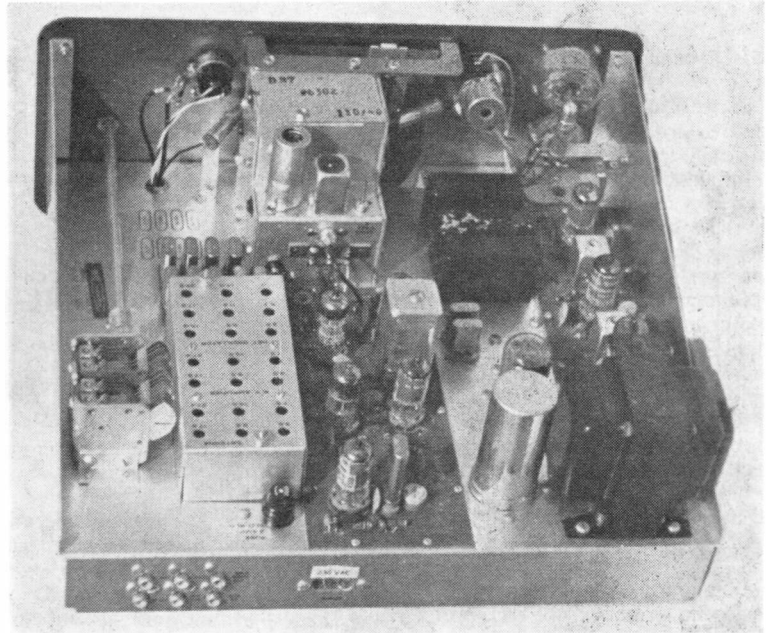
The model tested and illustrated here was fitted with the normal AM filter, having a nose bandwidth of 5 kc, and 15 kc maximum at 60 dB down, plus the accessory SSB and CW filters. There are two SSB filters available, both being 2.1 kc at the nose, but the 60 dB bandwidth of the standard one was 7 kc, while the *de luxe* version is only 5 kc wide at the same reduction. As for the CW filter, this is only 400 cycles wide at the nose, and 2 kc max at 60 dB down, centred on a beat note of 1000 cycles. As we have remarked, the receiver tested had AM, SSB and CW filters fitted, although only the AM unit comes as

standard, the others being accessories. With the SSB filter comes the extra crystal to enable sideband switching, and the wiring of the function switch varies depending on which options are taken in the way of these filters. An adjustment by means of a varicap diode enables the sealed Linear Master Oscillator unit (which provides the tunable oscillator function) to be adjusted as sidebands are switched so that if one is zero-beat to a carrier frequency one stays there when changing to the opposite sideband.

The crystal filter used on AM signals proved to be quite a revelation, the signals appearing to leap up out of the mush, and disappear as cleanly when one tuned the band. SSB performance was as good, or better, and the CW filter, coupled with the fine stability was a revelation; your reviewer can honestly say that he has never come across such a receiver for CW operation. The 400 cycles at the nose is enough to ensure that a bit of drift at the other end does not result in complete loss of the QSO, while the steep sides made tuning across such a crowded band as, say, Forty in the evening, just a matter of stopping and reading the wanted signal with little or no trouble from QRM. It was really quite a surprise to be able to work stuff on Forty and feel the band was not overcrowded!

For comic relief one could tune to the highest range and, if the 27-28 mc region was open, listen to the antics on the Citizens' Band in the States—and to be thankful the Post Office have not seen fit to allow it in this country!

Half-rear chassis view of the SB-310, showing general arrangement. Note the row of crystals at mid-left.



Sensitivity on all ranges was up to specification, and the cross-modulation performance seemed excellent, although no actual measurements were taken. Thus, reception of broadcast stations on their bands was extremely good, the selectivity being a great help in sorting them out. With the SSB filter in one has the possibility of taking them like a sideband signal, in "exalted carrier" fashion, and then trying each sideband in turn to see which was less plastered in QRM if the going got difficult.

Circuitry

A simplified block diagram is given in Fig. 1, and being shorn of such complications as bandswitching is easily seen to be quite conventional in most respects. Examination of the circuit diagram in detail confirms this, and indeed about the only unorthodox thing about it is the AGC/Muting arrangements, which are shown in Fig. 2, on p.84.

In any receiver using a crystal-controlled front-end, the stability is primarily a function of the tunable local oscillator; and this stage in the Heathkit SB-310 is the sealed-box-of-tricks (supplied as a completed unit) which is called an LMO, or Linear Master Oscillator. Breaking the seal on this is the way to repudiate the warranty! But inside it there is a quite conventional and simple single-wave oscillator which is trimmed to exact frequency by means of a varicap diode and a potentiometer—the pot. being outside the box so there is no excuse for wanting to break the seal anyway! Calibration of the dial against the 100 kc marker pips is carried out in the usual way by moving the cursor on the fixed part of the dial assembly.

Mechanical Points

It has already been mentioned that assembly

should be easy by following the instructions. However, to that should be added that the mechanical design is, in its own way, a classic. The underside in particular is a fine example to a budding engineer of how to make a piece of gear which has not only fine performance, but also a layout facilitating rapid servicing and maintenance. Further, the finish, metal surface coating and such details are of a very high order—excepting that in our case one of the filters had quite clearly been added to the receiver after kicking around on the shelf for some time; but equally obviously, it goes without saying that Daystrom would not supply a filter in this condition as part of a kit.

Appearance

While it is true to say that if one wants the absolute minimum of operator error in controlling a piece of radio gear one must have a complete lack of symmetry and no two knobs the same shape, it is equally true to say such a layout would be unutterably offensive to the eye. The SB-310 is nicely balanced with the essential controls well-grouped around the dial, a nice big tuning knob, and that quiet air of breeding about it which only a few mechanical designers of impeccable taste seem to be able to achieve. Few wives could cavil at this receiver in their living-room.

Handling on the Air

Delightful! A smooth and positive drive, and operating experience was well up to what one would expect in a receiver in this price-range. After an hour or so, the receiver felt as though it had been in the shack for years.

A point here is that it is well to remember that generally CW operation will be found best with AGC

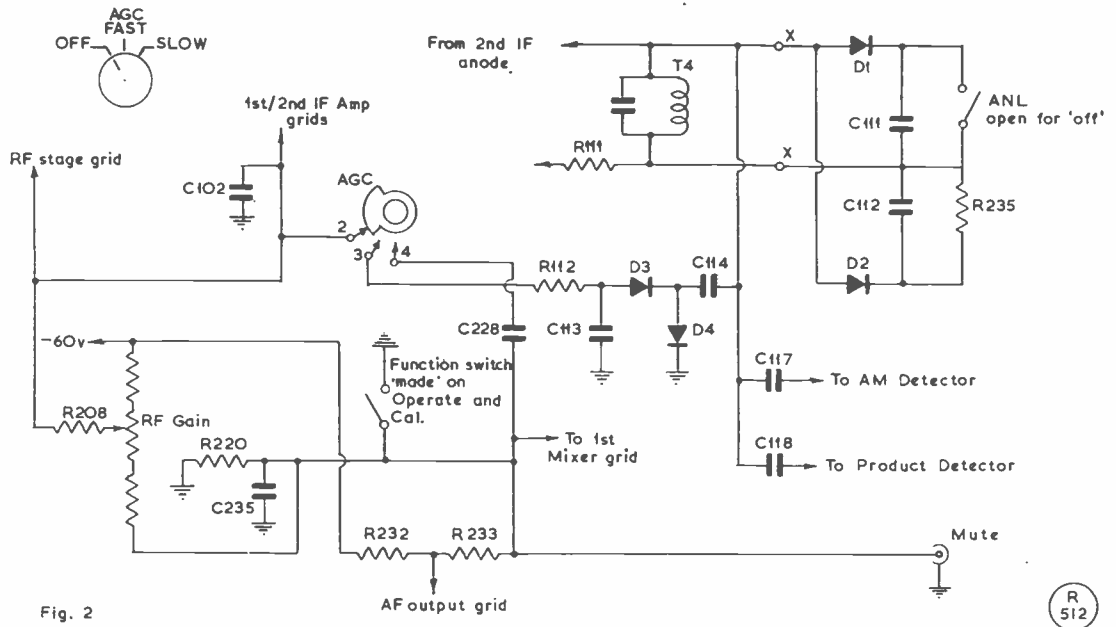


Fig. 2

Fig. 2. AGC/ANL circuitry, SB-310. Table of values opposite.

Under-chassis view of the Heathkit SB-310 receiver, as factory wired.

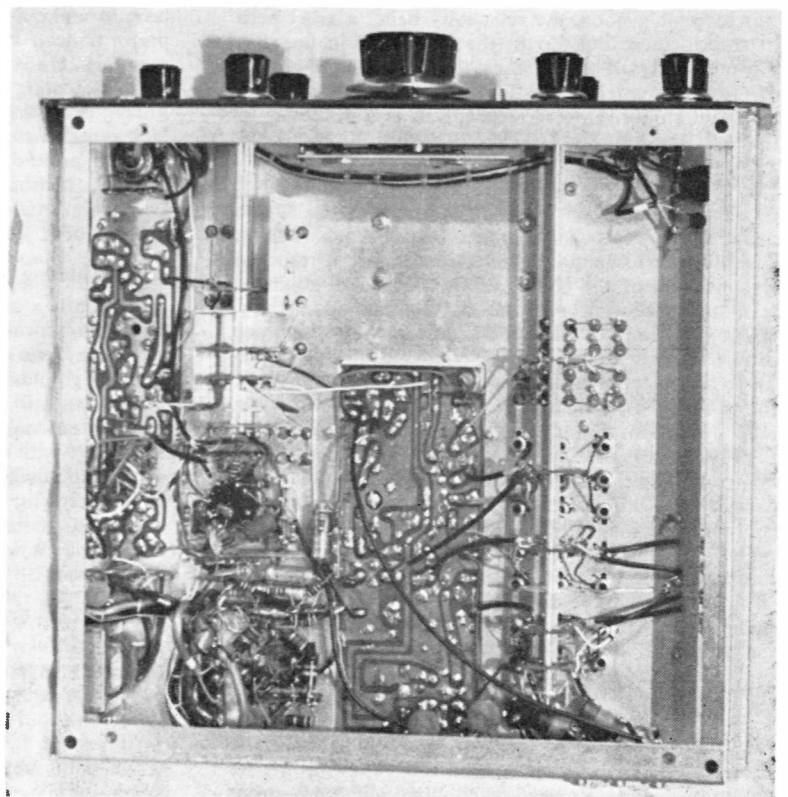


Table of Values

Fig. 2. The AGC/Muting/ANL Circuit

C102 = .001 μ F	R112 = 4,700 ohms
C109,	R208 = 5.6 megohm
C111,	R213,
C112,	R220,
C113 = .01 μ F	R235 = 20,000 ohms
C114,	R214 = 47 ohms
C117 = 5 μ μ F	R232 = 470,000 ohms
C118 = 1 μ μ F	R233 = 15,000 ohms
C228,	D1, D2 = ANL diodes
C235 = 0.2 μ F	D3, D4 = AGC diodes
R111 = 1,000 ohms	

Note: The values quoted here are taken from the manual accompanying the SB-310 and are given for information only.

on, and RF gain well up, controlling output in the conventional way of the BC set on the AF gain. Reversion to the normal method of operating with AGC off, AF right up and controlling signal level with the RF gain is likely to lose signals that might otherwise be booked in, and should only be resorted to when a really big signal inside the passband is making things difficult. (This is all explained in the instructions.) Plenty of AF is available at the headphone output, and this is a trap for those using "stethoscope" headphones (as your reviewer does), which can overload on a whiff of a signal—one just has to remember to keep the AF well down, otherwise overloading in the headphone gives a totally false impression of what the receiver is doing.

Criticisms

Not many, but your reviewer is old enough and sufficiently of a realist to believe that even a Rolls-Royce can be improved upon—for instance, by fitting /M gear! Though the Heathkit SB-310 is in the very top class of commercial products, there are a couple of minor points that are worth looking into. First, it is fitted with an American standard two-way mains lead—no earth wire—and this could well be changed to a three-pin arrangement. Secondly, and because of the first one important, is that earthing the receiver is by the braid of the coax cable connecting the aerial to the receiver. Not really a safety hazard but when (as in the writer's case) everything in the station is grounded to the mains earth and the RF earth only to the ATU, this could be annoying. Also, the various outputs at the back—to the hi-fi, muting when used, speaker, and so on—are all "phono" plugs grouped too near to the aerial socket. One could easily mismatch the plugs if the set is placed in the usual state of receivers, namely with its back to the wall.

Summing Up

The SB-310 is a first-class job within its specification—which is that of a highly specialised BC/SWL general coverage receiver, and it is within those limits that it is discussed here. It caused no TVI, it looked good in the shack, and it is a fair specimen of the Heathkit SB-Line. For any SWL interested in the bands it covers it is about the best there is obtainable. What more can one say?

TOP BAND WITH THE TRIO JR-500S

DISCUSSING A POSSIBLE MODIFICATION—AND USING A Q-MULTIPLIER

E. JOHNSON (G2HR)

IN the December 1968 issue of SHORT WAVE MAGAZINE mention was made briefly of the modifications necessary for conversion of the WWV range for Top Band reception. As a number of enquiries have been received, it is proposed to give the information in detail. It is thought it would also be helpful to advise on factors necessary to obtain the best performance in conjunction with a Q-Multiplier.

Choice of Crystals

It was explained previously that the 19.1 mc crystal in the original circuit serves a dual function. The receiver 1st IF runs from 8.9-9.5 mc, thus the additive frequency is 28 mc-28.6 mc, coming up on

the first segment of the 10-metre band on the black scale.

Switching to the WWV range gives the difference frequency, which is 10.2-9.6 mc. A quick calculation will show that WWV or MSF (whichever is audible) will appear at 300° on the red scale, as indeed one will find the gauge mark.

It will be apparent that if the existing crystal is disconnected from position 6 in the circuit, position 1 will be available, and another crystal can be installed with an extra holder and associated coils. The crystals shown in the Table may be used, that for 11 mc possibly being more popular as this is obtainable from *Lowe Electronics*.

TVI Factor

As was previously pointed out, the 4th harmonic of the crystal falls near Channel 1, and can cause mild patterning—more so if a television receiver has a set-top aerial in close proximity. For that reason, the writer (although this has not been proven) would avoid a crystal higher than 11 mc, as the harmonic would fall nearer the vision frequency.

Discussion has taken place on the unusual choice of an acceptor circuit for harmonic suppression across the crystal itself. Reasons were given in the December article. Suffice it to say that this device works, no doubt because crystal vibration in itself is

Table

CRYSTAL FREQUENCY	RECEIVER COVERAGE	TOP BAND READING ON RED SCALE
11.0 mc*	1.5—2.1 mc	200°—400°
11.1 mc	1.6—2.2 mc	300°—500°

*Receiver reading erroneously stated as 200°-300° in December issue. Whilst any crystal between the above limits could be used, any other frequency would make it impossible to read direct off the tuning dial.

not purely sinusoidal. The adjustment of the trap is quite critical, and it is suggested that this be done side by side with the television receiver.

Detailed Modifications

Apart from the crystal and additional holder, a 1.8 mc, or so-called "shipping band" oscillator coil is necessary. A type *must* be obtained with the two windings side by side, with sufficient separation to cut the coil in half, such as *Repanco*. An additional dust core is also necessary. The mechanical work is shown in the diagram opposite.

The preliminary lining-up should be done by adjusting the cores at 1.9 mc with the aid of a GDO. Final adjustment may be made by feeding in a signal from a crystal calibrator and peaking up on the S-meter. Here one should emphasise that the crystal frequency must be accurate. Any error in calibration can only be corrected by adjusting the 2nd solid-state oscillator, and as this is common to all bands, interference with this could upset calibration on the other bands.

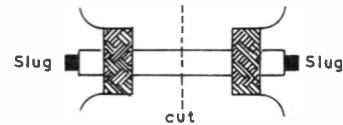
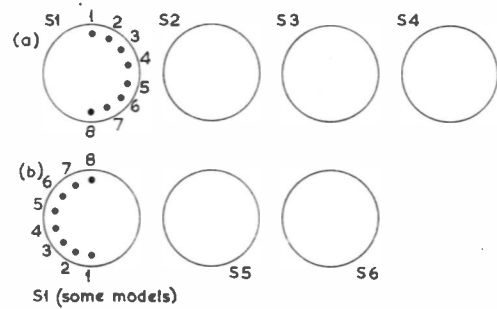
Usually, peaking of the front-end with the pre-selector will occur around the segments marked 3.5 and 14 mc. When this is established, the Top Band sweep can be marked on the dial perimeter with Indian ink.

Q-Multiplier

In the December *Magazine* article, the necessity for a Q-multiplier was emphasised to give enhanced selectivity for CW, the Codar RQ-10X being chosen. For the best performance, adjustments to this accessory should be carefully done. The instructions supplied are very complete, but the tuning-out of the reactance of the co-axial lead with L1, marked on the base of the instrument, is very flat, and it is important that the IF stage be brought precisely into re-alignment.

Two approaches are possible: One can tune in the beat from the crystal calibrator and adjust for maximum S-meter reading. The meter is very small, and it is difficult to determine the peak. Alternatively, one can switch in the BFO after carefully tuning in "on the nose," and adjust for maximum reading on an output meter.

The writer has chosen what he considers is a better method. There is a crystal BFO, offset by 1.5 kc. Ensure again that the signal is accurately tuned



Switch wiring modifications: S1, disconnect 1 from 4, connect to 2; S2, disconnect coil from 4 and add in series half osc. coil for 1.8 mc, connect to 2; for S3, disconnect 1 from 4, join to 2; on S4, remove coil connection 4, add in series other half 1.8 mc osc. coil, connect to 2 with additional slug. S5, take 1 from 6, connect new xtal from 1 to ground, using additional holder; S6, disconnect 1 from 6, connect to 5. NOTE: In some models, switch numbers on S1 are as at (b), but manual shows as in (a). Switches S2-S6 are as given in handbook circuit diagram.

in. with the Q-Multiplier passband dial set to zero, and switched to the "out" position. Advance the Peak control until the IF stage goes into oscillation. Then adjust L1 until the frequency is the same as the BFO. Carefully done, you will probably obtain a slow beat which is accurate enough. An oscilloscope can, of course, be used instead for frequency comparison, but there seems little need to go that far.

If these adjustments are done with care, a signal should be at its maximum with the Q-Multiplier at "Out" or "Peak," without any alteration being necessary to receiver tuning or the passband dial. Appreciation is due to G3VCJ for his co-operation in this conversion, which can be done in about one hour.

NEW QTH—G.P.O. RADIO BRANCH

We are asked to say that the address for all matters affecting AT-station licence matters is now: The Radio & Broadcasting Dept., Amateur Licensing Division, Waterloo Bridge House, Waterloo Bridge Road, London, S.E.1.

IMPORTANT EXHIBITION

The 21st of the series sponsored by the Radio & Electronic Component Manufacturers' Federation, their next Exhibition—to be known as the "International London Electronic Component Show"—is being held during May 20-23, at Olympia, London. It will be the biggest exhibition of its kind yet, with 436 firms represented, 75 of them from outside the U.K. This is also the first time that the Exhibition has been opened to foreign manufacturers, so should be of exceptional interest.

DESIGN FOR A CW TRANSCEIVER

FOR THE HF BANDS—PRACTICAL CONSIDERATIONS AND CHOICE OF CIRCUITRY

Part I

T. HARRISON (GM3NHQ)

DURING the winter of 1966-67 it finally became obvious to the author that something would have to be done about the HF-band equipment in use at GM3NHQ. At that time activity was on the 14 mc and 21 mc bands, mainly in the CW areas, with a 75-watt transmitter, while the receiver consisted of an 80m. "Command" Rx with a crystal controlled converter for 20-15 metres. This combination had performed more or less satisfactorily for a number of years, but the transmitter was beginning to bring in the odd T8 report and a noticeable "chirp" had developed on the 21 mc band. The receiving equipment was also beginning to show signs of wear and consequently it was decided to replace the entire HF station with something (a) Newer, (b) Better, and (c) More compact. But the question was—"replace with what?"

Like most other amateurs in this situation, the author started by leafing through the advertisements but a glance at the figures after the £ signs soon convinced the author—and more importantly, the author's XYL—that the answer did not lie there. The only way out was to build, but build what? A further search through the literature brought forth a number of likely designs for all-band transmitters and receivers. It was also plain, however, that GM3NHQ had neither the time nor the resources to undertake the construction of some of these exotic creations. Thought was then given to what was in fact really required in the way of transmitting and receiving equipment, as distinct from what was ideally wanted—two quite different things.

The first fact to emerge from a study of the station log was that about 60% of the author's operating time was spent on the CW section of the 21 mc band, the remaining 40% being spent mostly on 14 mc CW. It also showed that the author had only about a dozen QSO's on any other band throughout the year. Obviously it was a waste of time building an *all-band* transmitter and receiver when primarily only two of the bands would be used. Single band, or at most two-band, equipment would meet the requirement and this greatly simplified the problem. The new equipment would have to be compact, preferably in one cabinet. "One cabinet" means "transceiver," and so the basic requirements were set out: The project was to be a single band CW transceiver for either the 14 mc or 21 mc band.

Design Considerations

The literature was once again brought out but needless to say no design was found for a CW transceiver. There were SSB designs in plenty but CW seemed to have gone out of fashion. However, the SSB designs incorporated a number of good ideas, in particular the use of heterodyning to change frequency. In all transmitting equipment previously built by the author the VFO had always been at some low frequency (in the interest of stability and purity of note) and this demanded a number of frequency multiplying stages to get up to the desired HF band, inevitably giving rise to drifting, chirping and TVI. The heterodyne technique seemed the ideal way out of all these problems, since a low-frequency VFO could be heterodyned with a high-channel crystal oscillator to give the required operating frequency directly. This would eliminate the frequency multipliers, with consequent improvement of the TVI situation, and if the crystal oscillator was keyed instead of the VFO as previously, there should be little or no chirp. In addition, it was obvious that by the heterodyne technique the same VFO could be used for both the

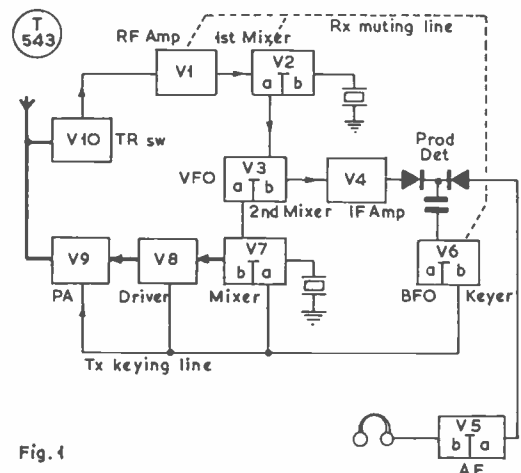


Fig. 1

Fig. 1. Block diagram for the HF CW Transceiver.

FREQUENCY SELECTION TABLE

Band	Rx 1st Osc. mc	Rx Xtal mc	Tunable 1st IF mc	VFO mc	2nd IF kc	Tx Osc. mc	Tx Xtal mc
14 mc	7.973	7.973	6.027 to 6.127	5.575 to 5.675	452	8.425	8.425
21 mc	17.250*	5.750	3.750 to 3.900	3.280 to 3.430	470	17.720*	5.9066
28 mc	22.650*	7.550	5.350 to 5.850	4.880 to 5.380	470	23.120*	7.7066

* Derived from overtone oscillator giving crystal third harmonic

transmitter and receiver sections, simplifying the design of a transceiver even further. Having accepted the heterodyne principle and a common VFO for transmitter and receiver a number of other points became apparent.

If one has a transmitter/receiver combination with only one VFO, say in the receiver, by using the heterodyne technique for the transmitter oscillator and by choosing the correct frequency for the crystal-controlled component of the transmitter mixer, it is possible to arrange that the transmitter will continuously track the receiver as one tunes round the band, thus giving single knob control of station frequency and avoiding the need to "net" the transmitter to the receiver for every QSO. Consider the argument following in which a double-conversion receiver is assumed, with a crystal-controlled front end and a tunable first IF. Suppose F_1 is the received frequency and F_r is the receiver crystal frequency, then the tunable first IF, IF_1 , is $F_1 - F_r$. Now, if the receiver second IF is IF_2 , then the required VFO frequency is $IF_1 - IF_2$, or $IF_1 + IF_2$ if the VFO is on the high side of the first IF. Assuming the VFO frequency is $IF_1 - IF_2$, then to heterodyne this to the required transmitting frequency, which is the same as the receiver frequency F_1 , we require on transmitter crystal frequency, $F_t = F_1 - FVFO$

$$\begin{aligned} \text{i.e. } F_t &= F_1 - (IF_1 - IF_2) \\ &= F_1 - (F_1 - F_r - IF_2) \\ &= F_r + IF_2 \end{aligned}$$

Applying this to, say, a 21 mc transceiver, $F_1 = 21$ mc and if F_r is made 17.25 mc (because surplus crystals are available for this), then IF_1 becomes 3.75 mc.

Now, if standard components are used for the second IF at, say, 470 kc, then the VFO frequency is 3.75-47 mc, i.e., 3.28 mc, and there should be no difficulty in providing a stable, pure VFO at this sort of frequency. Thus, the transmitter mixer requires a crystal-controlled component at (21-3.28) mc, i.e. 17.72 mc to produce a signal on 21 mc from this VFO (and again crystals for this are available on the surplus market). Note that almost any combination of frequencies can be chosen for the crystals and the IF's, the only requirement being that the frequency difference between the two

crystals equals that chosen for the second IF. However the frequencies selected should result in the VFO operating at a fairly low frequency for good stability and note, the second IF should be low for reasonable Rx selectivity and, especially in the author's case, the crystals should be readily obtainable. The crystal oscillator frequencies mentioned in the foregoing are in fact those required for the 21 mc transceiver which is described in detail in this article, and are obtained from surplus FT-243 crystals of 5750 kc (for the receiver) and 5059.6 kc (for the transmitter) by using overtone oscillators.

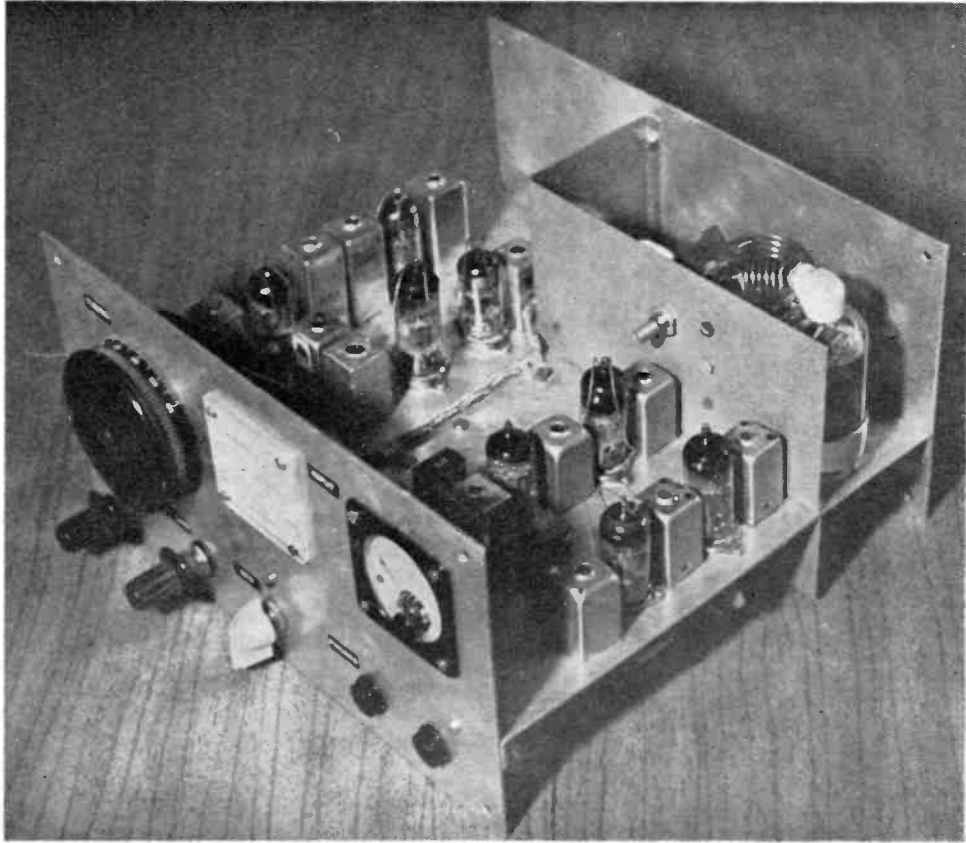
Receiver Tuning

The great advantage of the system as described is that the transmitter and receiver are on the same frequency at all times, the result being that the transmitter is automatically "netting" on each received signal as the receiver tunes over the band.

So far so good. But what happens if the transceiver operator calls "CQ"? He "tunes around the band for any possible call"—and in so doing shifts his transmitted signal off its original frequency, thereby causing some concern to the station replying to the CQ and is looking for a reply on the original frequency. Unless the call and reply are on the same frequency, the chances are the QSO will not take place, especially in conditions of QRM. It appears that our tracking system is of doubtful advantage since in fact it is desirable to have the receiver tuning independently from the transmitter. What we in fact require, however, is the ability to tune the receiver a few kc only on either side of the transmitter frequency—"Receiver Incremental Tuning," to use the commercial transceiver terminology. This can be achieved in the present instance in three ways:—

- (1) By altering F_r , the receiver crystal frequency,
- (2) By altering the VFO during receive periods,
- (3) By altering the second IF.

In the 21 mc design described here F_r is obtained from an overtone oscillator, whose frequency cannot be altered, although had a fundamental crystal of 17.25 mc been used, a VXO could have been adopted here.



General view of the CW Transceiver. The 6146 PA stage and T/R Switch are enclosed by the screening panel at the rear. The PA tank condenser is mounted on this screen.

The VFO can be varied during receive periods either by simply returning to the original transmit setting at every "over," or by arranging varicap diodes which changed over with the transmit/receive relay. This latter system is in fact used by at least one of the commercial transceivers but was rejected in this case since no relays or switches are used for transmit/receive changeover—apart from the Morse key, that is!

The solution adopted at GM3NHQ is simply to vary the second IF—and this does *not* mean simultaneously tuning two or three pairs of IF transformers. It simply means varying the BFO frequency since it is the BFO that finally determines the *exact* operating frequency at which zero beat occurs in a CW receiver.

Consider again the previous argument: If F_1 is the initial received frequency and F_r and the VFO frequency are kept constant, the second IF is $F_1 - F_2 - FVFO$ and zero beat occurs when the BFO is set to this frequency. Now suppose the BFO is set to $IF_2 + 5$ kc, the high frequency which gives this as a second IF is $(IF_2 + 5 \text{ kc}) + FVFO + F_r$, i.e. $(F_1 - F_r - FVFO + 5 \text{ kc}) + F_r$, which is $F_1 + 5$ kc—in other words, the new received frequency for zero beat is 5 kc higher than before and the

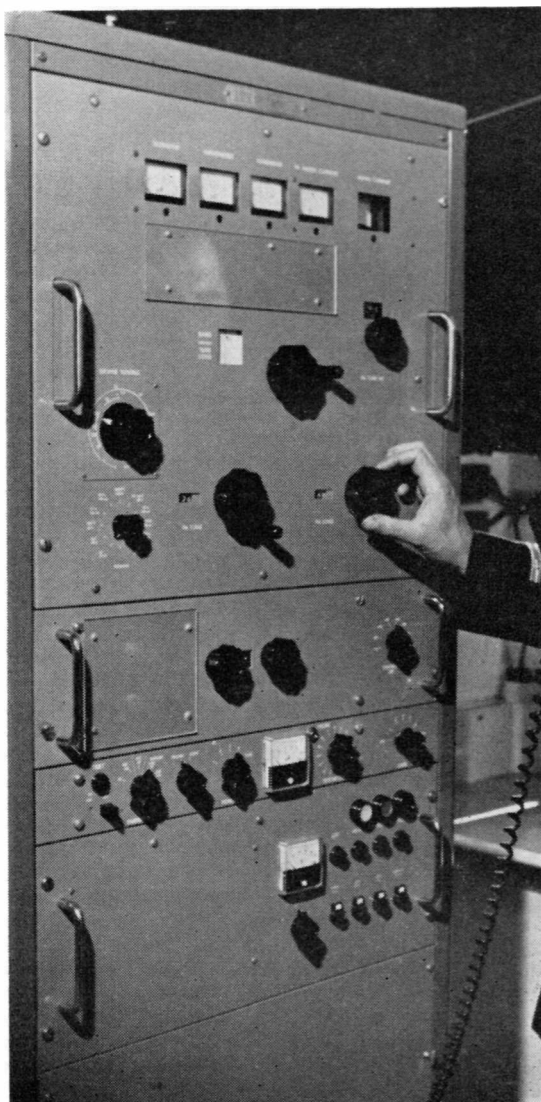
HF band has been tuned over 5 kc simply by altering the BFO frequency by 5 kc. Now, using this technique with a highly selective 2nd IF strip would result in a marked loss in sensitivity when the BFO was "tuned off," since the new HF signal would be outside the receiver's second IF passband—remember that the actual frequency to which the second IFT's are tuned has not been altered, only the BFO setting. If, however, the receiver passband is deliberately made, say 10 kc wide, there will be no noticeable loss in sensitivity over a ± 5 kc BFO swing. The resulting receiver system is not too selective, but for CW operation this can be rectified by having a selective AF section.

The important point to note is that although the received HF signal has been tuned by altering the BFO setting, the transmitted frequency has not been upset since neither the VFO nor the transmitter crystal frequencies have been altered. Thus we have a system which arranges that the transmitter is constantly netted on to the receiver frequency, yet allows the receiver to be "tuned around" slightly without upsetting the transmitter frequency. This arrangement has been in use in the author's equipment for the last two years and has

proved entirely satisfactory.

So much for frequency control considerations. However, before leaving the problem of crystal oscillators, it is worth mentioning that the heterodyne principle greatly facilitates full break-in working in a CW rig, since only the crystal controlled component of the VFO need be keyed, the variable frequency component being left running continuously, thus making it much easier to obtain a stable, chirp-free signal under full BK conditions.

Considering now the practical transceiver design as developed: The equipment as used on the 21 mc band is described here although the author has built a similar unit for 14 mc, and both 28 mc and 70 mc units are at present under construction. (Crystal frequencies and other details for these are given at the end of this article.)



Circuit Configuration

The block diagram for the 21 mc unit is given in Fig. 1. This shows a transceiver having a double-conversion superhet receiver with a crystal-controlled front end and tunable first IF, the CW transmitter having a heterodyne-type VFO and straight-through amplification at 21 mc to a 6146 PA stage. Full break-in keying is provided and a T/R switch prevents overloading of the receiver front end while the transmitter is on. AM operation requires only the addition of a suitable modulator.

Considering first the receiver section, V1 is an EF183 RF amp. feeding into V2, an ECF80, which is the first mixer, the triode section of the ECF80 operating as an overtone oscillator at 17.25 mc. These two valves form in effect a crystal controlled converter as the front end of a single-conversion superhet, tuning from 3.75 mc to 3.9 mc to cover the CW section of the 15-metre band. The converter output of 3.75-3.9 mc is converted to about 470 kc by V3, an ECF80 mixer, the triode section of which operates as a VFO covering 3.28-3.43 mc. One stage of 470 kc IF amplification is provided by V4, an EF183, before demodulation by CR1, CR2, two OA71's arranged as a product detector. V5, an ECL80 gives sufficient AF amplification for headphone operation (as preferred by most CW operators). The tunable BFO is obtained from one half of V6, a 12AT7, the other half of which arranges receiver muting during transmission periods. The transmitter mixer, V7, is another ECF80 in which the VFO output of 3.28-3.43 mc is mixed with the CO output at 17.72 mc to give 21 mc drive at the same frequency as the received signal. One EF183, V8, provides sufficient 21 mc amplification for V9, the 6146 PA stage, to run an input in the region of 50-60 watts. V10 is the T/R switch, using a 12AT7, to prevent receiver front-end overloading while allowing receiver and transmitter to use the same aerial. Grid-block keying is applied to the PA, driver, and transmitter crystal oscillator stages, while V7b, the keying valve, applies a muting bias to the first two stages of the receiver when the key is closed.

(To be continued)

IT MAY SURPRISE

Those who realise, these days, that when trusting anything to the post one must get the address right is that on occasion we receive (eventually) missives directed to "S.W.L., S.W.M., Bucks." While it is a tribute to the Post Office that in the end they find our slot, it is scarcely giving them a chance when things like this have to go through many sorting offices. The four words you must use in full when writing to the Editorial Dept.—and they are the only four words needed—are SHORT WAVE MAGAZINE, BUCKINGHAM.

On p.763 of the February issue, we showed the radio room of the R.M.S. "Queen Elizabeth II." On the left is one of her eight transmitters, rated one kilowatt, remote controlled from the operating position. These transmitters, which feed into notch aeriels in the ship's funnel, give a wide selection of spot frequencies and ensure communication all round the world by proper use of the seven marine bands in the HF spectrum.

PI-TANK CIRCUITRY AND CONSTRUCTION

PRACTICAL CONSIDERATIONS AND VALUES FOR THE HF BANDS

F. G. RAYER, A.L.E.R.E. (G3OGR)

THE well-known transmitter *pi*-output tank configuration allows the PA anode circuit to be tuned to resonance, and to match into a wide range of output impedances. Various *pi*-tanks have been used while attempting to get the best RF output, for a given PA DC input, and it is felt that information on these should be of help.

Fig. 1 is the usual circuit. The PA DC input is $I \times V$, where I is anode current shown by M1, and V is anode voltage. One way of measuring RF output is by the RF meter M2, with non-inductive load resistor Z . Output is $I^2 \times Z$. Efficiency (as a percentage) is $\text{Output}/\text{Input} \times 100$. The following is a quite typical example:

Input: 100 mA at 500v. = 0.1×500
= 50 watts.

Output: 0.8A through 50 ohms = 0.8×0.8
 $\times 50 = 32$ watts.

Efficiency: $32/50 \times 100 = 64\%$.

For absolute results, anode voltage, Z , M1 and M2 have to be checked, and the proper correction factors applied to Z and M2 as frequency is raised. But for comparisons, it is only necessary to employ the same PA input each time, and look for a rise or fall on M2.

C1 is to by-pass stray RF. L1 is the tank coil. VC1 is the PA tuning or input capacitor, and VC2 the output (or "loading") condenser. C2 is the *pi*-tank coupling capacitor.

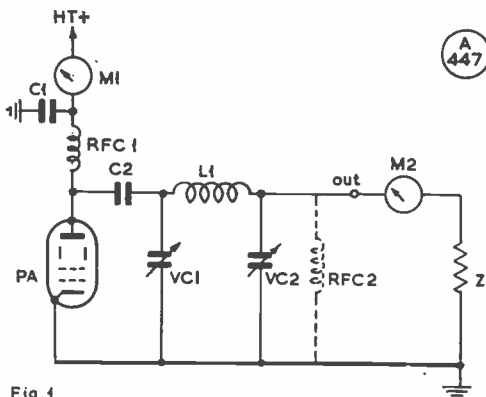


Fig. 1

The minimum voltage rating of VC1 should equal the HT voltage; or be twice this for AM. Typical spacing is 0.07in. for 3 kV, 0.05in. for 2 kV, 0.03in. for 1 kV, and the use of non-miniature receiver type capacitors for 500/600v. maximum. VC2 can have receiver type spacing for any normal purpose (e.g., 150w. maximum). C2 absolute minimum rating should be twice the HT voltage (this also applies to C1). Higher ratings, for a safety factor, are wise. RFC2 is an added precaution, to keep HT from a feeder or directly connected aerial if C2 leaks or fails. RFC2 may be 2.5 mH, 100 mA.

All values can, of course, be calculated for any particular set of working conditions, but it is not proposed to repeat the formulae here because they can always be used by anyone who favours this approach. One possibility is that there may be difficulty in providing enough capacity for VC1 and VC2 at low frequencies, or in easily having sufficiently low values at VC1 for high frequencies.

The table on p.92 shows typical round values for a PA of about 2500-3000 ohms anode impedance, loaded circuit Q of 12, and 50 ohm and 75 ohm outputs.

The important points are that we normally expect both VC1 and VC2 to be well open for the HF bands, while VC1 may be near zero capacitance on 10m. These values include stray circuit capacitance—usually at least 10 μF across VC1, which might itself have a minimum capacitance of 10 μF . So we never expect each band to tune nicely around the middle swing of VC1/VC2.

[over

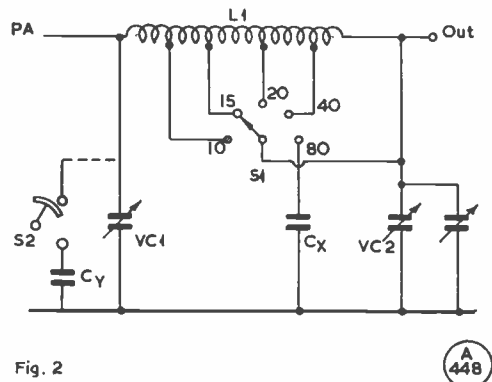


Fig. 2

A 448

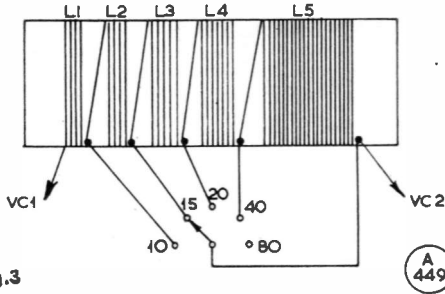


Fig. 3

Fig. 3. Tapped tank coil for five bands—see text.

Switching Capacitances

Fig. 2 is a typical 5-band tank circuit, with L1 tapped for 40m. and higher frequencies. VC1 is often about 200 $\mu\mu\text{F}$, and VC2 generally a 2-gang 500 $\mu\mu\text{F}$ capacitor, giving 1000 $\mu\mu\text{F}$ in all. A 3-gang condenser bank would provide .0015 μF .

From the table, 900 $\mu\mu\text{F}$ or even 1500 $\mu\mu\text{F}$ may be marginal. When this causes tuning difficulty, the unrequired contact of S1 could bring in Cx, in parallel with VC2, on 80 metres only. Cx is high quality mica, generally around 470 $\mu\mu\text{F}$ to .001 μF , according to the size of VC2.

Where VC1 is of insufficient capacity, an extra switch section S2 can introduce Cy, again for 80m. only. Cy is high voltage mica, often about 75 $\mu\mu\text{F}$. Employing a smaller component at VC1 is actually of advantage for the HF bands.

In some commercial equipment both VC1 and VC2 are of relatively small value, and extra fixed capacitors (like Cx and Cy) are switched in for each band. This simplifies manual tuning into a limited range of impedances.

In some circuits, VC1 is a ganged type. One section is employed for the HF bands, and S2 places two or more sections in parallel for the LF bands. This allows values to be appropriate for each band.

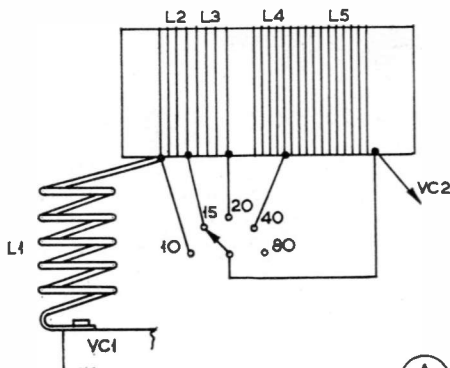


Fig. 4

Fig. 4. Alternative tank arrangement with separate 10-metre coil.

Table

BAND	Value VC1	Value L1	VC2 (for 50 ohms)	VC2 (for 75 ohms)
80m.	200 $\mu\mu\text{F}$	11 μH	.0015 μF	900 $\mu\mu\text{F}$
40m.	100 $\mu\mu\text{F}$	5.5 μH	750 $\mu\mu\text{F}$	450 $\mu\mu\text{F}$
20m.	50 $\mu\mu\text{F}$	2.8 μH	370 $\mu\mu\text{F}$	250 $\mu\mu\text{F}$
15m.	33 $\mu\mu\text{F}$	1.9 μH	230 $\mu\mu\text{F}$	180 $\mu\mu\text{F}$
10m.	24 $\mu\mu\text{F}$	1.4 μH	180 $\mu\mu\text{F}$	125 $\mu\mu\text{F}$

Note: Values for VC2 refer to assumed output impedances at the PA tank. Under practical conditions, when feeding into these loads, values for VC2 could be between these limits. The point here is always to set up the condition to give maximum RF output into whatever low-impedance load is presented by the aerial. If the limits of the aerial loading are known, the values for VC1, L1, VC2 hold good.

Switching Efficiency

In Fig. 2, L1 has a number of turns shorted by S1, for all bands except 80m. This is a common method in commercial equipment. When looking for maximum efficiency, it may be felt that the shorted turns cause important losses on the HF bands. However, if the RF output is measured on 10, 15, 20 and 40m. with L1 as in Fig. 2, and then L1 and S1 are removed and the right coil fitted for any one band only, no practical improvement need be expected. Energy absorbed inductively by the unused section of L1 is either very small, or is returned inductively to the operative part of the coil. Actual losses depend on the design of L1 and other factors. Measurements on switched coils showed that losses from switching and shorted turns need have no significant effect under practical conditions.

S1 should be heavy duty or have doubled contacts, for all but low power. Some commercial designs favour a switch with progressively shorting contacts, so that all tags are shorted. Though theoretically this is a good thing to do, measurements comparing results against those with a switch as in Fig. 2 showed no detectable change in RF output—and it is with RF output that we are concerned.

Two-Band Tanks

A special case is raised by the 10-watt type of transmitter covering both 160m. and 80m. An unswitched circuit, like Fig. 1, is sometimes used. Then VC1 may be 500 $\mu\mu\text{F}$, and will be nearly fully closed for 160m., but well near minimum capacity for 80m.

Efficiency measurements show that this need not cause any practical loss of output on either band. However, the range of impedances into which the tank will operate is different for each band, and reduced. With unfamiliar equipment, the wrong anode current dip may be tuned, e.g., with the PA acting as doubler. There may also be a reduction in harmonic suppression, and a measurable increase in sub-harmonic radiation. (By the latter is meant the presence of a 160m. signal when operating on

80m., a phenomenon not unknown!)

The two-band unswitched tank would thus seem most suitable when it is certain a correct type of aerial will be used, or an appropriate tuner or coupler.

Five-Band Tanks

Fig. 3 is a 5-band tank on a common former. Sections are marked L1 to L5 for ready identification. For 10m., L1 only will be in circuit. On 15m., L1 and L2 are used together in series. In the same way, L3 and L4 are added for the 20m. and 40m. bands, and all windings L1 to L5 are in use on Eighty.

A threaded ceramic or other low-loss ribbed former is most convenient, but no measurable difference in RF output could be detected when using a smooth, polished paxolin tube instead. Turns can more easily be regularly spaced on a threaded former.

A quite compact tank for a 6146 or similar PA, for about 60w. input, can be wound on a 1½ in. dia. former, using 18g. for L1, L2 and L3, and 20g. for L4 and L5. L1 is 6 turns at 8 turns per inch. L2 is 2 turns at 8 t.p.i. L3 has 4 turns, spaced by wire diameter. L4 is 6 turns at 16 t.p.i., and L5 is 12 turns at 16 t.p.i. A space of ½ in. is allowed between each winding. This gives 6 turns for 10m., 8 for 15m., 12 for 20m., 18 for 40m. and 30 for 80m. If stray capacities are a little high, the 10m. tap will have to be moved one turn towards VC1, giving 5 turns for this band.

All associated switch and other wiring should be extremely stout and short. VC1 may be 200 μF, and VC2 .001 μF. If VC1 must be smaller (possibly 150 μF) L4 should be 8 turns, and L5 16 turns.

With the object of improving efficiency on 10m. a separate coil is sometimes used, as in Fig. 4. This may be self-supporting, 14g. wire, or copper strip, and will usually require about 5 turns, ½ in. in diameter. If there is much stray capacity, e.g., when using 6146's in parallel, 4½ or 4 turns may have to be adopted. The inductance can be modified by spacing turns more widely. L2 to L5 are at right angles and completely out of use on 10m.

L2 will add 2 turns or 3 turns, according to L1, etc., for 15m. L3 adds about 4 turns, for 20m. L4 and L5 may have numbers of turns as for Fig. 3. L2 to L5 will thus be 30 turns in all. If wound with 18g. or 16g. throughout, this will do for 100-125 watts, employing a ribbed ceramic former.

With ready-made *pi*-tank units (coil with switch) it may be necessary to use alternative 10m. and 15m. tapplings, in particular, to suit stray capacitances. Similar adjustments could be needed with Figs. 3 and 4, according to the PA valve or valves fitted, the minimum value of VC1 and other factors.

LF Band Tanks

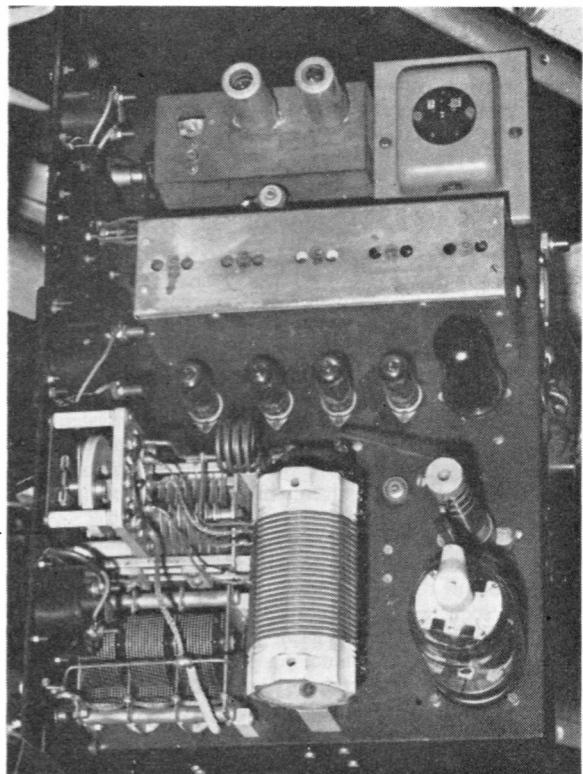
A PA coil suitable for the usual type of 10-15 watt 160/80m. transmitter can have 68 turns of 22g. enamelled wire, occupying a 2in. length on a 1in. diameter paxolin tube. It is centre-tapped for

80m. Sixty turns (also centre tapped) on a 1½ in. dia. former will be similar.

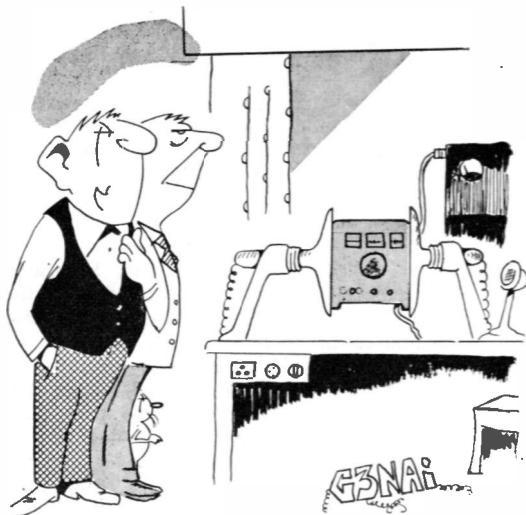
Instead of using an on/off type switch for 80/160 metre change-over, it can be convenient to have a 3-way or 4-way switch, providing an alternative winding for each band. This allows easier loading, with some aeriels. As an example, the two-band coil can have the option of 30 and 40 turns for 80m., and about 60 and 75 turns for 160m.

Single-Band Tanks

These can be permanent or plug-in, according to the usage expected. They can be wound from the inductance values listed in the Table, or can have turns according to the number which would be in circuit in Fig. 3. As more space will generally be available, 16 or 14g. wire can be used for all HF bands. If the plug-in type of coil has spare pins, these can be used to bring into circuit one or two sections of VC1, or capacitors such as Cy and Cx (see Fig. 2) to suit the band.



This photograph shows the mechanical layout and construction of a multi-band tank circuit of the type discussed in the adjoining article. It is actually a five-band PA with an 813 in the final, and was built by G3FVW (Scarborough). The tapped main inductance, ten-metre coil and band change switch above the tuning and loading condensers can be clearly seen.



STATION CHANGE-OVER SYSTEM

CIRCUIT FOR QUIET OPERATION

B. D. SIMPSON (G3PEK) and C. BIRKETT (G3SMI)

OVER the years, the writers have used a variety of change-over systems of various combinations of switches and relays but they have all suffered from the same disadvantage—crashes and bangs on either changing over to “transmit” or back to “receive,” or both.

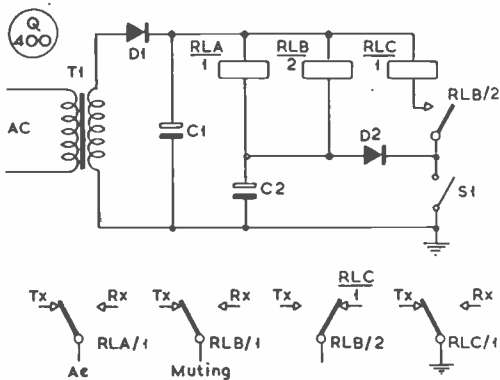
It was realised that what was needed was a system of sequence switching so that the receiver was muted and aerial changed over before the transmitter switched on and, conversely, the transmitter switched off before the receiver came back on.

At both stations, negative bias is used for muting the receiver and transmitter, although this circuit is equally applicable to other methods.

The sequence of operation is as follows:

When S1 is closed, RLA changes over the aerial immediately and a contact on RLB opens at the same time, removing a short from the negative muting bias and muting the receiver. A second contact on RLB closes, completing the circuit for RLC, which then operates and shorts the transmitter muting line to earth. C2 is also discharged.

When S1 is opened, the earth return for RLC is broken and this opens immediately, thus muting the transmitter. The relays RLA and RLB are held over, however, until C2 has fully charged through their coils and thus the return to “receive” is delayed. The time taken to return to the receive state can be altered by varying C2, a value of 50 μF providing a reasonably quick return although perfectly silent.



Power for the unit is provided by T1 and although only half-wave rectification is employed (by diode D1), adequate smoothing is given by C1. Diode D2 is necessary to isolate RLC from the delay capacitor C2.

The unit is constructed on a 6in. x 3in. chassis with the transformer mounted on top and the co-axial relay at one end. The other relays and components are all fitted underneath. At both G3PEK and G3SMI, S1 consists of several switches in parallel; on the unit itself, on the transmitter and a foot switch (an old Morse key) for rapid change over while leaving both hands free.

Values and parts for the circuit herewith are as follows: C1, 2000 μF, 50v.; C2, 50 μF, 50v. (see text); D1, D2, BY-100 or similar; S1, SPST toggle; RLA, 24v., coax aerial relay; RLB, relay 24v., with one “make” and contact for Rx muting; RLC, relay, 24v., with one “make” and/or contacts for Tx muting, as required; T1, transformer, 24v. 1 amp. (can be 12-0-12v. with centre-tap not used).

With regard to the components, all including the co-axial relay are currently obtainable from N.W. Electrics, 52 Gt. Ancoats Street, Manchester.



“... Always keep it short here ...”

STRANGE FAULT ON TWENTY

PROBLEM OF DRIVE, AND ITS CURE

J. MACINTOSH, F.C.C.S., M.I.E.R.E. (GM3IAA)

At the time it was observed, this so-called "fault" was classified as rather unusual but one which did not materially affect transmission. Experiments were being carried out on the main transmitter, which is similar in design to the one illustrated on p.121 of SHORT WAVE MAGAZINE of May 1960—see Fig. 1 below for the schematic arrangement.

Pi-section inter-stage coupling is used between the 6CL6 and the 5763, and between the 5763 and the PA (a TT21) which operates at 150 watts input on all bands 3.5 to 28 mc. V1 and V2 are frequency multipliers, driving power being controlled by potentiometers fitted to each screen grid. This control is absolutely essential on all bands except 28 mc, in order to prevent over-driving, with all its attendant evils.

When making drive adjustments on 20 metres, it was observed that the meter M in the grid circuit of the TT21 behaved in a somewhat erratic manner. With the drive on, and the PA HT disconnected, the meter registered 8 mA approximately with the appropriate grid bias in use. The PA was then switched on and adjustments made to the PA anode tuning capacitor to the point of resonance. During these adjustments, which were made with reduced drive, the meter reading, instead of remaining relatively steady, varied greatly from a low reading of around 3 to 4 mA to a high reading of 14 mA or so, depending on whether the PA anode tuning capacitor was tuned to the high frequency or to the low frequency side of resonance. It was first thought that over or under neutralisation was the cause, but, as the transmitter behaved perfectly on all the other bands, this was ruled out.

Neutralising

Neutralisation tests can be carried out on a PA by the following procedure:—

(I) Tune both grid and anode circuits to resonance,

(II) Observe the grid current of the PA and tune the PA anode circuit *slightly* to the HF side of resonance (*i.e.*, use less capacity). If the grid current rises, *more* neutralising is necessary. If the grid current decreases when tuning to HF, then *less* neutralising is required.

Neutralising is just right for that frequency when the grid current peaks at the exact point of anode current dip. This procedure applies more to triodes than to tetrodes, but nevertheless, it is a useful guide.

Although not strictly necessary in this case, a slight amount of neutralising had been carried out on this PA by feeding RF from the anode of the TT21 to the input side of the *pi*-coupling coil at the point marked "X" in Fig. 1, which could be the fixed plates of the tuning capacitor C2. This feedback can be effected by running a piece of insulated wire from "X" to the PA by the shortest route. The wire is joined to the circuit at "X," but at the PA end the wire is bent into an upright position for about one inch and fixed at a short distance from the outside of the bulb of the PA. This distance has to be found by experiment and may vary considerably from one transmitter to another, depending on the layout and the screening employed. Capacity coupling is achieved between the PA anode and the wire, and under no circumstances should connection be made direct to the anode. Such adjustment is best made on one of the HF bands, either 28 mc or 21 mc, and the adjustment will then hold good, more or less, on the other bands. In the writer's case neutralising was not really necessary as screening and decoupling had been carefully carried out.

So what was causing the erratic behaviour on 14 mc, and *only* on that band?

Another point was that the grid drive on 14 mc was

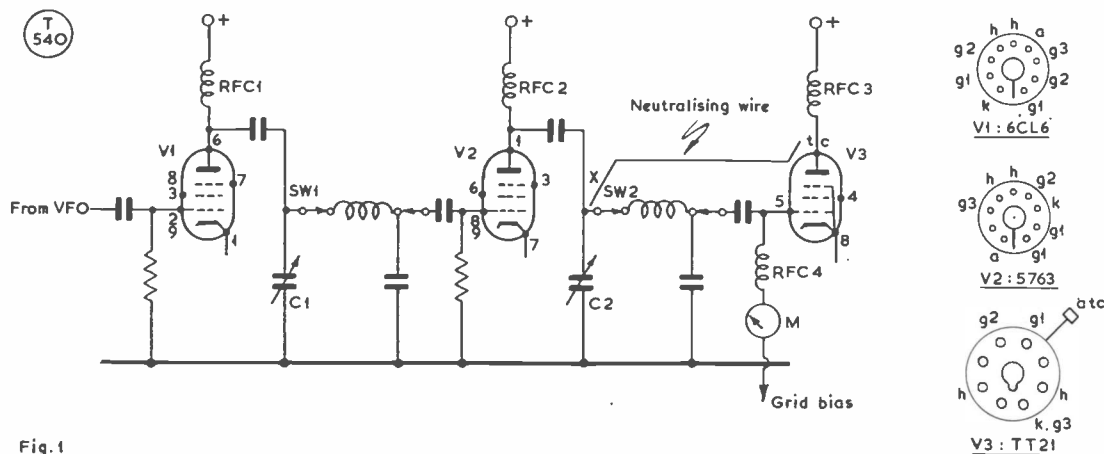


Fig. 1

Fig. 1. Basic circuit discussed in text.

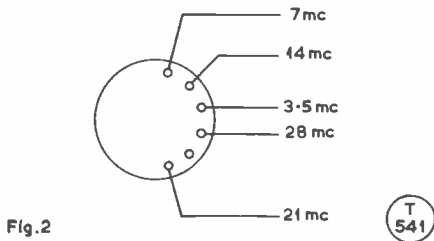


Fig. 2. Coil grouping round main switch S2.

low when compared with the maximum possible on 21 mc. Although slight alterations to the PA grid coil—number of turns and size of loading capacitor—did improve matters very slightly, this was clearly not the answer to the problem and was not proceeded with.

Fig. 2 shows the approximate layout of the *pi*-coupling coils around the switch SW2. For a short time the transmitter was used on all bands including 14 mc, but as adjustment of the PA anode tuning was invariably a little “touchy” on 20 metres, it was decided to discover and cure this erratic behaviour once and for all.

Investigation

The particular transmitter unit was taken out of its cabinet. The filament current of the PA was left on, but the HT was disconnected, and, with the drive on, care was taken to run the grid current at a low figure and for relatively short periods only, to avoid over heating of the PA grid. The possibility of coupling between two or more of the coils was considered and a screen was placed between the most likely offender (the 7 mc coil) and the 14 mc tank winding, but to no avail. No change in drive was observed so the screen was positioned between the 3.5 mc winding and the 14 mc coil—and, lo, an immediate increase of grid current was obtained. Coupling was obviously taking place between the two coils, the 3.5 mc coil apparently “sucking out” energy from the other. The coil switch SW2 connects the various coils in circuit, but does not short out those not in circuit.

Fig. 3 shows the circuit of the 3.5 mc coil when disconnected.

The remedy was now clear, either to screen one coil from the other, or alter the characteristics of the 3.5 mc tank, and the latter alternative was adopted. Before the coil was altered, tests with a grid dip meter showed that, in a disconnected condition, the 3.5 mc coil was resonating at about 13.5 mc.

The winding on the 3.5 mc coil was decreased by about ten turns, thus reducing the inductance, and the loading capacitor was increased in value. This proved to be a complete cure, the maximum obtainable grid drive reading on 14 mc had now increased considerably and the transmitter operated exactly as it should, on all bands.

Some readers may wonder why the former alternative, *i.e.* screening, was not adopted. True, it would have been simple to have fitted a small screen and so avoided alterations to the 80m. coil. While screening is often essential, unless very carefully carried out as regards spacing, etc., the characteristics of a coil may

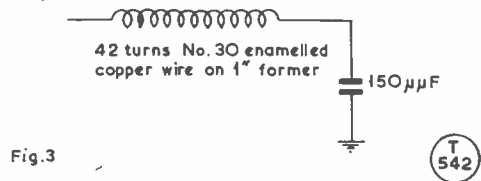


Fig. 3. PA grid coil for 80 metres.

very well be degraded by the too-close presence of a screen and so result in inefficient operation. A third alternative, indeed, was available; this being to move the 3.5 mc coil further away from the other coil, but, as a great deal of space was not available, this was not attempted.

As it turned out, the alterations to the 3.5 mc coil resulted in a slightly greater drive being available on that band, an increase which was not actually required.

THE FLOW OF QSL CARDS

On previous occasions we have commented on the heavy load nowadays imposed on the QSL Bureaux of the world. An interesting summary in the January issue of *Radio ZS* (journal of the South African Radio League) discloses that their Bureau alone handled nearly 105,000 cards during last year—and they only have a membership of 1,600! The report comments “some members are very active and receive and send stacks of cards, while others are quiet and give the bureau very little work.”



“... Have a pretty good valve line-up ...”

COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

HOW often does one come on the air for a short spell and find oneself sitting in the middle of a raving great pile-up after some rare DX-station. Often when this happens during a QSO one cannot hear the DX, but only the people calling it, due to such factors as aerial directivity and so on. All one can reasonably do is to QSY as smartly as possible and hope that not too much damage has been done to someone else's contact.

However, after this had happened to your scribe once, he sat down and thought for a while—and the theme of the thinking was somewhat along the lines of "How can it be avoided?" Of course, it cannot be completely avoided, however carefully one listens on the frequency before launching a call; on the other hand, it is equally obvious that a lot of the clottedry is because some folk are just plain cloth-eared or unequipped with receivers, or even do it deliberately when the DX has failed to come back to them. However, much of this could be stopped if people would only try and time their calls more sensibly, avoid using different (or difficult) phonetics, and above all eschew long calls without breaks for listening. A quick three-times-three and a listen is far more effective, and productive of far less QRM than the long-winded bleating one so often hears going on long after the DX signal has gone away or worked several stations through it. Another thing is to listen for a while before launching a call on the DX, get his name—if you really want it—and his QSL data from earlier QSO's, and then when the time comes, call him, swap reports and away to give the others a chance. Nothing is more maddening to others waiting than the chap who wants the whole rigmarole given on the last contacts repeated over again for his special benefit.

But if the DX station wants a ragchew, let him—after all it becomes a bit of a bind being in a rare spot

and being unable to do more than exchange numbers with the whole wide world, when the operator is lonely and would like nothing better than a good chat; and it is only courteous to indulge him in this simple pleasure.

Ten-metre Doings

Naturally enough, at this time of the year one should expect somewhat of a lift in conditions, and so, by and large, has been the case. Things have also been improved a bit by the "spreading" effect on activity of the Five-Band DXCC, both on this and the low-frequency

ranges—which is a very good thing!

When you get to the top of the lists, new countries are about as easy to find as hen's teeth, and by this line of reasoning G3DO (Four Oaks) had a bumper month. HKØTU made an all-time new one on Twenty, and a new one on the band above, while the 28 mc score went up no less than four, by QSO's with FO8BS—S9 the long way round—SVØWN, AP2MR and GC2LU in Jersey.

An indoor inverted-Vee is the G3XTJ (Palmer's Green) aerial for his favourite 28 mc band, on which he managed to work all W call

SIX-BAND DX TABLE
(All-Time Post War)

Station	Countries	28 mc	21 mc	14 mc	7 mc	3.5 mc	1.8 mc
G3IGW	204	127	152	168	122	86	42
G3SED	128	20	18	62	43	39	38
G3KOR	163	40	57	135	52	39	23
G3NYQ	147	35	70	107	40	30	21
G3WPO	72	11	13	43	45	21	21
G2DC	335	169	307	327	165	110	20
G3VPS	116	20	34	91	50	36	14
G3WJS	61	—	8	47	35	40	14
G3IAR	221	126	161	193	91	73	12
G3PQF	156	102	45	87	84	53	12
G3IDG	122	74	89	55	27	19	11
G3DO	335	196	232	328	90	83	9
G3LZQ	254	138	155	201	72	38	8
W6AM	348	131	140	347	116	54	7
G3MDW	116	47	66	83	20	15	7
G3NOF	312	164	207	296	34	39	2
G3EJA	106	100	23	51	22	12	2
G3VDL	137	47	98	100	45	22	—
9H1BL	117	69	33	76	35	39	—

Note: Placings this month are based on the "1.8 mc" Column.

areas, also VE4, TR8AG, 6W8XX, 6W/W4BPD, UM8AP, VU2GGB, VS6CO, KP4BCL, KP4CL, 9J2RQ/A, HH9DL, XW8BP, KG4DH, UL7, ZS, and others of lesser breed. Although Edwin has such a new call, he is by no means a novice at the game, and indeed your conductor recalls his interest in Top Band and VHF DX listening way back in 1956—which only goes to show yet again that the operator is more important by far than the gear or the aerials.

G2HKU (Sheppey) had a pleasant QSO when he found he was not the only amateur from Sheppey—VP2LX (St. Lucia) is the other! His SSB also connected with 9J2GA, MP4BBA, SV0WN, VP8HZ, and VP2GLE (Grenada), UD6KBO, ZC4TK, 4X4HJ; and the countries for this band went up by three—the 9J2 and the two VP2's.

Quite a short letter this time from G2DC (Ringwood), who has been kept out of his shack by the icy weather, but was around enough to note that 28 mc conditions were better at the beginning of the month than later. Jack, incidentally, comments on the HK0TU expedition, and their superb operating and fairness in dishing out the QSO's. He in fact worked this one on all five bands—but no gain thereby, as G2DC had worked the last expedition to Malpelo on all five bands.

Peter, G3VPS (Wartling) has managed to stay out of the arms of the law—see last month—and spent his spare afternoons on Ten, where 9H1BL and W's were worked on Sideband, and TA2E, VP2DAP, ZE1DI, UA9 and W's with the key.

G3SVW (Manchester) was particularly amused to read of G3VPS being "investigated," as a similar situation occurred about three years ago with him. Quite clearly G3SVW must have been in a contest, because he was getting very cross with a receiver that had gone "on the blink" and his language when the knock came on the shack door was quite strong. However, he opened it—and there was the cop! However, 0400 or not, he also satisfied the man, and having apologised for his language, the incident passed off as a joke. After a long period of inactivity. Ron now has a K.W. Vespa Mk. II which he uses mainly

for CW on the HF bands and SSB on Top Band and Eighty.

Not much of what goes on escapes G3XYP (Navenby) but David was somewhat hampered by the fact that his beam was down for three weeks of the period. After the first rush of activity when the ticket arrived, G3XYP is reverting to the habits of his SWL days, listening much more, and looking out for the stations he made friends with as an SWL. Not surprisingly, this approach has produced more real DX than the first rush. Ten yielded QSO's with FH8CE, HS3DR, KZ5EK, TJ1AU, VK9BB, VP8KD, VU2GGB, ZS3S and 5H3KJ, all on SSB.

G3NOF (Yeovil) has been licensed since 1959, but has, of course, been well-known as an SWL for far longer—way back in 1935 in fact he was sending out the cards. Don's letter this month tells more than usual, and in terms of 28 mc mentions openings on occasion to S.E. Asia around 1000, W's audible from 1130 to 2100, and South Americans during the evening towards the end of the period. Contact was made on 10m. with FG7XX, KG4DH, K7ERW, K0MKO (Colorado), VU2GGB, all W call districts, XE2WH, ZS's and 6W8DY. Among the gotaways were CE0AE, HK0TU and HS3DR.

Contests and Awards

Pudsey group have announced an award, for working Yorkshire stations. There are three classes to the award, for three categories of stations—U.K., Europe and DX. Class III requires respectively 10, 5, and three contacts; Class II, 20, 10 and 4; Class I 30, 15 and 5. Log data only—no cards—to G3WGW, QTHR, with 5s., \$1, or 8 IRC's. He will also be glad to explain details.

As far as Contests go it seems the last weekend in April and the first in May will be bedlam, with three events on the former and four the latter—someone blundered there, well and truly! Seriously, one wonders whether the organisers of some of these affairs ever stop to think about what else is or is not already on the ground for the proposed period. After all, most of them come into the Contest Calendar, even if the folk in the

country of origin know it not.

Fifteen Metres

Last November PY0SP was on St. Peter and St. Paul Rocks, and W6AM (Long Beach, California) was after him. Reports were duly exchanged on Phone, 59 both ways—your conductor has never known Don to have a report of less than 59!—to give a Phone total for DXCC of 344 countries confirmed, no less.

Both G3NOF and your conductor have considerable trouble with TVI on 21 mc, and so neither of us is much active on the band. However, G3NOF managed to exchange reports with JA's, MP4TCE and TU2AZ.

Another TVI victim is G3XTJ, who as a result has a completely "Nil" report to offer; owing to the BBC Channels being so low in frequency things are pretty poor, but it is to be hoped the longed-for alleviation really begins when BBC-1 goes on to UHF, and people then start to buy single-standard 625 receivers. But by then we will be sitting at the trough of the sunspot cycle!

From G3XYP we hear of TN8BK, VP2AA, 6W8DY and 9N2CF, all brought to book on SSB, although one would suspect that David is not enormously enamoured of the band.

G2DC, as already remarked, spent very little time in the shack, but out of his experience and the short time spent looking around, Jack was able to form the opinion that 15 metres was indeed as lively as expectations would have it in

FIRST YEAR OPERATOR'S LADDER

TOP BAND ONLY

Call	Counties CW	Counties Phone	Countries
G3XDY	67	19	14
G3XTL	62	—	13
G3XJT	49	58	12
G3XVC	32	17	10
GM3YCB	1	57	9

Note: A first entry for this table must be accompanied by a statement of the date of first licensing. The same County may be claimed for both Phone and CW. Placings will be by taking a different column each month; this time it is based upon the "Counties CW" column.

relation to the sunspot number; and that opinion is pretty well shared by all correspondents this time.

Our real 21 mc specialist has been missing on occasion of late, but logged enough to make him feel it worth-while writing. GM3JDR (Golspie) is the man, and he found the band is open from 0700z right the way round to 2100z—but of course he himself has to QRT by 0855! Nevertheless, CW gave ZD3A, ZS3AW, KG5ARO, KR6NR, UL7CG, VP9BO, VK5DS, UH8CS, ZP5KA, LU7DNN, HM1DE, ZL2GS, JX2XJ, ZS6BT, 9H1BM, KZ5EK, CO2BM, VK3AZY, UA9GE, FR7AB, UW0IW, HM4FA, UA0CA, CO2BB, HH9DL, PY2DSE, UW9YH, VK3ML, ZE1DI, ZS5WH, CR6AI, LU1EVG, UA9RA, VK2BNK, UA9VX, UV9CO, VK2EO, UA9PP, ZS2ED, ZS4AK, UL7BF, 3V8VA, EL2BE, UA9ES, PY2OU, PY2DRP, CP3CN, YS1O, PY1CPC, EA8FH, CR6LB, CR6KB, PY7VON, CR6EI, HK3AVK, YV4AQ, FL8MB, EL0A/MM, UL7BX, all W call areas, VE1-7 and JA1-O, the latter being taken not by the dozen but the gross! As contrast SSB produced all W and JA call areas, plus 9Q5GE. (Phew—and again *phew!*)

Maritime Mobiles

Three reports to consider this time, all of which are of interest in one way or another. Perhaps we should first take EL0A/MM, who signs GM300K when at home. Jake has had the EL permit since last August, but only started using it in earnest from December. Needless to say, the call has been pretty popular with the customers and as a result has drawn upon itself far more than the usual collection of Clots. Most of them seem to emanate from Europe, particularly the East, and no amount of sending "KN" or anything short of QRT could stop them. As Jake remarks, such an experience would tend to make one remain QRT. The prize of them all was the 4X4 who tried to break up several QSO's with Europeans, and then followed it up by sending CQ right on the frequency—using the EL0A call!!

G3UOF/MM set off from U.K. with his nice new KW-2000A and



The operator of HV3SJ, Bro. Edward Aram, is also in charge of Vatican communications. His AT-station is situated near the Basilica of St. Peter's in Rome, in the extra-territorial zone of the Vatican City. And a very nice array of gear he has, too!

before he had covered enough distance to get out of European waters the ECF82 in the VFO decided to go u/s, and so put him off the air even as far as listening was concerned, until arrival at Capetown a couple of weeks later when the Company's helicopter service passed over a replacement. The battle for permission to have the /MM rig fully operational on the ship is still going on. As far as the listening watch is concerned, the note last time round has already resulted in a few enquiries, and those who are interested enough to drop him a line should end up with well-organised opportunities for finding how they get out to DX on Top Band. This trip more attention has been paid to the HF bands, and very little has been heard of 160 metres. Thus on February 22, G2CIW was 579 on 28 mc, from the area of CR7, and on the following day, off S.E. ZS-land, G3NYQ (58), G3NJK (57), G3PYG (57) and G3HIU at 59 using AM were heard around noon local time. March 3 saw the watch take a change of frequency to

Forty, where G3FIM was logged calling G3TPE, 579 at 2050z from the Persian Gulf.

Still with the /MM story we have a letter from G3UGF, who is now 2nd RO, but has no permanent posting which makes it a trifle hard for him to get coverage from the GPO. However, the ship's own tackle was used to have a little listen round, after 2300z, and as and when it was possible. Summarising, Richard found conditions poor in the main, and remarks that several stations would have been missed but for the fact that they were sending CQ very slowly. On the other hand, when in English waters it was found that some amateur signals were considerably stronger than the Coast stations! Richard, like G3UOF, would like to set up formal listening skeds—write to him, c/o m.v. *Oregis*, Houlder Lines, Ltd., 53 Leadenhall Street, London, E.C.3.

Old Faithful

And well might *Twenty* be so described, as a glance at the scores

in the Six-Band Table would reveal to the unbelieving. During the period under review 20m. seemed to be sitting up and taking a little nourishment after its poorer performances of late. However, there is still DX there getting no reply to calls. As an example, how about A2CAU—Jim is looking for U.K. contacts in the CW area during 1800-2000z, and at the time of his letter had only managed one QSO with England, G3US being the lucky one. Skeds could be arranged, no doubt, and the address is J. A. Large, A2CAU, Box 200, Francistown, Botswana.

Now to G2HKU, who mentions SSB contacts with ZL2KP, ZL3SE, ZL3JQ, ZL4KB, WA7ISH in

Arizona and VKØKJ on Macquarie Island for a new country.

G3VPS (Wartling) comes into the tale, and sounds quite pleased with his month's pickings. Most of the stuff was hooked in the early evening after 1800z, giving SSB with ZL1AH, EA8AE, PZ1, 9Y4, VK6XY, SV1, CN8, 9H1BL, PY's and YV's. CW resulted in JA, JH1 and HP1E.

9H1BL found time to look over most of the bands, and to keep up his little personal rivalry with G3VPS; Twenty was at times open to the States right through the night. While nothing spectacular was worked, the month was quite enjoyable both in terms of the short snappy contacts and the odd longer ragchew.

Even though the beam at G3XYP was down for most of the time, David still found opportunities to work the stuff on SSB, mainly mornings and evenings. In terms of results HKØTU, HS3RB, HK6's, VS6AL, ZL1ANT, 3V8AC, 4S7AS, 5L2AK, 9K2BV, 9V1PC, plus loads of 5Z4's and ZS's in the evening periods.

Over to G3XTJ, who is quite terse about his activities on 20m., as follows "LU, PY, and HV1SJ—i.e. Nil!"—but since his list is quite long for the other bands we have to conclude that his result arises from lack of operating time.

The analysis of the month by G3NOF finds things improved in the mornings, thanks to the earlier sunrise, with the band opening to the Pacific around 0700 after a spell of EU's, followed by the VK/ZL signals over the long path, accompanied by the cacophony from Europe still strong as ever—the condition of early-morning DX with only very weak Europeans seems to have disappeared. Around 1200 and 2100 VK was occasionally heard over the short path, working into W, but no contacts were made. The S.E. Asian signals in the afternoon have been less evident than one would have expected, even though XW8AX was S9 frequently, around 1900. Contacts were made with HKØTU, PJ2CC, TA1IB, TF2WLJ,

TN8BN, VK's, VS6AL, XW8AX-ZC4AK, ZL's, and 3V8AC. Gotaways included FK8AZ, FO8AB, FO8BS, FO8CG, all around 0800 and a frequency of 14125 kc; KC4USC, KJ6CD, KR8EA, VKØKJ, VQ8CS, W7ZFY/MM (*en route* to Heard Island), YK1AA, yet another "ZA" (this one calling himself "ZA1ST"), 6W/W4BPD and 6Y5EM.

Both G2DC and G3DO comment on the HKØTU expedition as the event-of-the-month as far as the bands were concerned. It was an excellent show on all bands, and no one need have gone without a QSO.

DX-Peditions

Whitsun first, and at this time there is the traditional trip by the EI lads to an island—Sherkin Island it is this year, about 6 miles off the Cork coast, and the operation will be on all HF bands Top to Ten, signing EIØSI, over the weekend May 31—June 2, running AM, SSB and CW. In addition, EIØSR will be coming up during the same period on 10-40m. signing /MM from the vessel *Shure Return* (!)

Nearer in time is the Easter GM exercise by six operators of the Dial House Radio Society, all GPO chaps. This being primarily a two-metre foray, Top Band will be activated by G3WFW, late evenings only, in the 1875-1880 kc area. Their itinerary is April 3-5 in Wigtown; 7th and 8th on the Isle of Bute; Inverness-shire April 9-10; and Perth over 11-12th. Their callsign will be GB2GM, and G3WFW is *QTHR*.

Looking for GW counties? G5YC, the Imperial College group, go to Wales between April 9 and 16, although we have no details as to just which parts of North Wales will be visited. As far as Top Band is concerned, the effort will be CW/SSB, times and frequencies are not stated. The G5YC call is, of course, *QTHR*.

Turning to another sort of DX-pedition, namely the W4BPD effort, latest news at the time of writing

TOP BAND COUNTIES LADDER

Station	Confirmed	Worked
<i>Phone and CW</i>		
G2NL	98	98
GM3UVL	98	98
G3APA	97	97
G3SED	93	95
G2HKU	91	95
G3WPO	80	86
G13WSS	75	85
G3WQQ	74	87
G8HX	72	81
G3VLX	64	89
G3WJS	56	83
G3RFB	55	78
G3IDG	55	61
G3XDY	44	70
G3XTL	35	62
G3VPS	27	53
G3XJT	25	68
G3XGD	25	54
<i>Phone only</i>		
G2NJ	98	98
G3VGB	82	91
G3WPO	69	76
G3MDW	67	82
G3PQF	55	77
G3RFB	36	47

(Failure to report for three months entails removal from this Table. Claims may be made at any time. Six months of "Nil" reports will also result in deletion.)

Reporting the HF Bands

is that Gus has been at ZD3A since early in March, with a visit to 5Z4ERR scheduled before going on to FR7 and VQ8. CW frequencies to monitor are 20 kc in from the LF band-edges, times GMT as follows: Eighty 0200, Forty 0100, Twenty 2200, Fifteen 1600 and Ten 1700. As for the SSB ones, we have 3795 kc at 0230, 7073 at 0130, 14195 at 2230, 21395 at 1630, 28495 kc at 1730. Cards, of course via W4ECI.

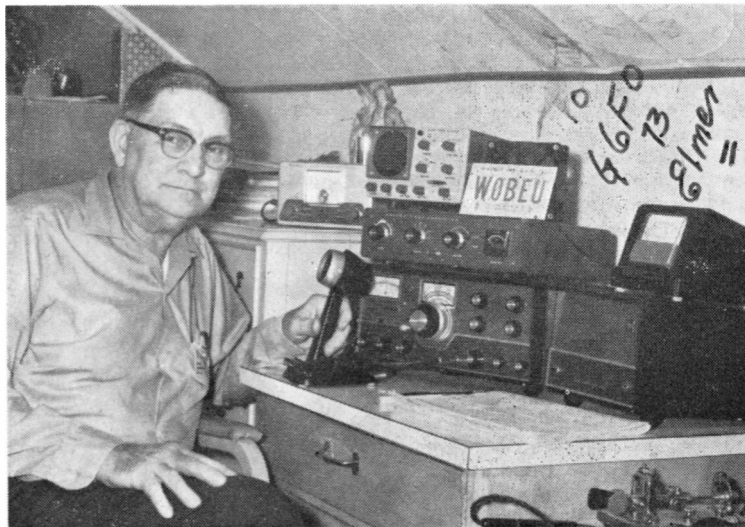
Eighty and Forty

Once again it is pleasing to find an increased emphasis on these bands. G2AYQ (St. Agnes, Cornwall) uses an NCX-3 on Eighty, and during the morning period between 0630 and 0800z worked VE2LT, VE3GTK, VE2EWY, WA2WMT, W1EFM, WA3KEC, VE8RCS, XE1KB, OX3WX, ZL2BCG, a three-way with CO2DC and VE1ASL/M, TI2PAS, TI5WM, VE1KAW, VP7NH, VE1EA and ZL4CA. Best among the gotaways was ZL3ABJ/C, lost in the pile-up. Ted uses a doublet as aerial, NE/SW at 350 feet a.s.l.—and his report should do much to encourage those who say they have not the aerial or facilities to have a go at for LF-band DX working.

9H1BL considered 80m. was slowly dropping off to sleep, with even the East European signals well down in strength, albeit PJ2VD (Curacao) came as a pleasant surprise. Forty has been wide open to the East Coast U.S. with the odd Caribbean signals mixed in from around 2200 onwards, with VK and the Far East a couple of hours earlier—all, of course buried under the off-putting EU QRM.

That inverted-vee at G3XYP is doing its stuff, and as a result David booked in EA8FE, OY5NS, VP7NH, ZC4HS, XE1KB and 6W8DY, all Sideband.

Forty as a band has been popular with G3VPS for a long time now, but this month saw very little serious use—W1, 2, 3, 4, and 8 were worked plus 9H1BL on a sked. Peter has a problem in that all his dipoles are overhung by tall trees and, although he has no idea to what extent the trees are having an effect on his signal, there is no doubt that in wet weather the loading changes



One of the products of a recent CW contact on 10 metres—picture of the station of Elmer Koehler, 9032 Windom Avenue, St. Louis, Missouri, 63114. The day of the QSO was his 70th birthday, when the photograph was taken! Elmer has a very nice, steady CW fist and his gear shown here is a Swan 350 transceiver, which feeds into a Mosley tri-band beam.

markedly. (An effect that is often noticed on the lower-frequency bands.)

A piece of "non-resonant wet string" is how G3XTJ describes his 7 mc aerial. In the ARRL Contest, Edwin worked W1, 2, 3, and 4 in short order, followed by VE3, which he found quite unbelievable—but was convinced the following weekend when he again went on and raised a W3 on SSB.

G2HKU used SSB for UR2NP—a new one for the band—EA4JL and HV3SJ, with W1LYQ hooked on CW, as his effort on 3.5 mc. As for 7 mc, SSB only gave Europeans, although CW produced HK0TU, some W's and VE2LI, an old friend of this piece.

160 Metres Doings

Here the news of the month is undoubtedly of W1BB. Last time out, we reported that both his home and the /1 stations were u/s. Putting the safety links back together was a fairly rapid job. However, although it was done in time for W1BB/1 to work HK0TU for his 100th post-War country on Top Band, the contact was not completed without some excitement. Seems that half-way through the QSO, W1BB suddenly found things *kaput*—SWR meter wrapped round the pin, no radiation and no reception!

A quick check proved a short in the feeder. Up that tower to look at the joints, and as luck would have it he found the second joint showing short-circuit, and full of water. Down tower, into car, home, grab coil of coax, back to tower and up the thing, re-make connections and sling bottom end down, back down tower, pull the end into the shack, reconnect, and breathe sigh of relief at 1:1 SWR. Luckily he was able to hear HK0TU still on the frequency, gave him a shout and finished the QSO, to the great annoyance of some others still waiting. Total time for repairs, about thirty minutes, including the climbing up and down the tower—pretty good going at 65 years of age, on a windy night! Congratulations on that 100 countries and on your fortitude, Stew!

Comments last time out on pirates has disclosed information on a group of these pests on Merseyside, and another in North London, complete with names and addresses! Among the odd ones, GM31AA (Inverness) mentions a station signing "GM2YT" and calling himself "Frank" who is disowned by the real G2YT, and also another one who said he was G2ECE—there is only just one, 2E call, G2EC! That "TF9AA" call is now defined clearly enough, and we also have

information on the gink who came on the band signing "SP," to add to the dossier.

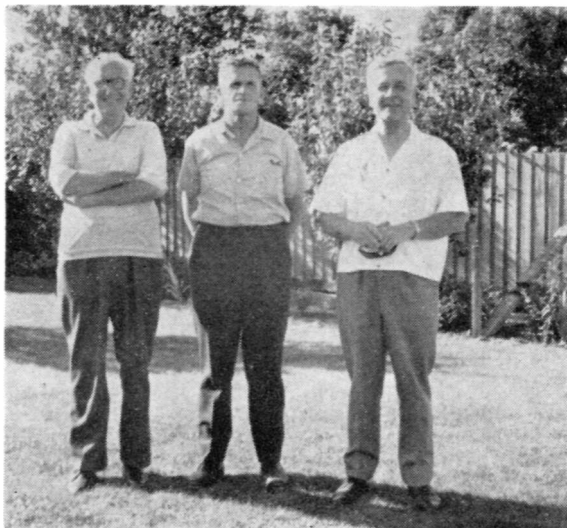
In a more civilised context, perhaps the most interesting of the domestic events was the appearance of G15AHS and G15AMS from Fermanagh. They seem to have caused quite a stir and to pretty effectively have removed Co. Fermanagh from the rare list. GI6TK took the opportunity to present them with the WAGI certificate, and when there was a bit of TVI on the Lantern in the local pub the landlord with no more ado switched it off so as not to spoil the DX-pedition! Doubtless all this will have given G15AHS and G15AMS a happy recollection of Ireland—but it could also be remarked that many of our locally inspired DX-peditions would do well to look into the efficiency displayed by these Americans—who have, incidentally, by now returned home. Their cards were sent out literally by return of post to those who QSL'd direct.

G3XTL (Warsop) was unlucky enough just to miss the deadline last time, with his question about "SP6AYN"—sorry, Chas., but NG!

With G2HKU the luck was a little better, in that Ted was able to snag G3HVX and so add Hereford to his tally; on the other hand CW was *not* successful in trying to raise GI2DHB in Londonderry, which remains on the "wanted at any price" list.

As early as 1730z has seen 9H1BL snooping around Top Band; hordes of OK/OL stations were heard and quite a few G's, with G3PIT and G3VPS as about the strongest of the bunch. G3XTJ has had a bumper crop of contacts over the period, with GM3PIP, GW3UZS, G3UNC/A (Dorset) and G15AHS/A as all-time new ones, not to mention GW3GWX, GM3VTB/A on CW, plus G3XCS for Cornwall, on the SSB side.

As for G3KFE, for various reasons he only made a few QSO's on Top Band, after shifting the gear and shack into the garage, just to see that the aerials still worked but those few contacts were of considerable interest. First, came G3WDW up in Leeds in broad daylight, and after dark a net QSO which included Northumberland (G3WTA) and City of London,



Recent photograph of, left to right: VK3AMM/G6XJ, with VK3MR (a picture of whose station appeared on p.29 of our March issue), and VK3ML, well-known in Australian business circles.

in the form of G3WWC/A.

Cyril of G13WSS (Holywood, Co. Down) sent us most of the detailed news of the G15AHS effort, as recounted earlier, and rounded off for himself by hooking GM3WOJ (Wigtownshire) for a new one.

Here and There

Last month's preamble seems to have touched on a spot, as the majority of correspondents commented on it. G2HKU (Sheppey) makes quite a habit of asking people what they do for a living, what they like in the way of books, and what their interests are, remarking that it is quite surprising how the other chap warms to you when you happen to hit on a subject of mutual interest.

On the other hand G3XLO (Manchester) has already become somewhat disillusioned by AT-station QSO's because, as he says, he feels most operators are in the habit of "shutting" off all their other interests when they are on the air, and any comments about books, music, whatever was on the Lantern the evening before, and such, is immediately turned back into the radio channel. The impression is heightened by the somewhat idiotic use of Q-code on phone, and signal reporting between stations who live a couple of miles apart and have

contacted each other dozens of times. True enough, most amateurs will tend to shy off a subject in which they do not feel they have any real opinions or strong feelings. One would feel the trick is to get the other chap to tell you what his major interest is, and then draw him out. Think of the buyer for a big store who parked his golf-clubs in a corner of the office one day; he saw about twenty assorted representatives, all after orders—and only one had the elementary *nous* to talk about golf! The buyer made his point when he commented that the chap who saw his golf-clubs for what they were was not only the rep. who went off with the order—but he was also the chap who consistently earned more than the others in the way of commission! (Nothing to do with Amateur Radio, but on the theme of making intelligent contact!)

Closing Comments

And so we come to the end of the tale for another month. By the time it sees print we should be sitting at the best time of year, with DX in the shack and the stirrings of Spring outside. Reports on it all will be welcomed, addressed to CDXN, SHORT WAVE MAGAZINE, BUCKINGHAM, to arrive by first post on April 7. Till then, Good DX and keep the gear activated.

VHF BANDS

A. H. DORMER (G3DAH)

March 8, was a good day for the GC stations of whom seven were known to have been active. Best signal in the South-East came from GC8BNV in Guernsey, followed closely by GC8AAZ/P in Jersey, who had 49 QSO's over the period. GC8BMO (Guernsey) was fading rather badly and GC2FZC and GC3KAV, also in Guernsey, were workable only with difficulty. By Sunday morning the opening had faded. Pressure throughout the period was stable at 1020 mB in the centre of the country, having climbed up from a dreaded low of 990 mB the previous week.

There were minor lifts into France on February 26 and March 2, and G2JF was working OZ on March 4! A feature of this opening was that there appeared to be little extended tropo., although more might have been expected from an examination of the pressure charts. Propagation was remarkably good for the 70 cm. Activity Night, both G and Continental DX being audible and the level of activity high.

The good propagation on Two and 70 cm. extended also to the 23 cm. band. G8ARM (London)

made it with G8AUE (Derby) just to show that the first contact between them was no fluke. G8AEJ (London) worked G3GWL (Bletchley) at RS-58 and 59 after several previous, and abortive, attempts. It was very unfortunate that both G8AEJ and G8ARM discovered *after* they had signed with FISA on 70 cm, that he was equipped and raring to go on 23 cm. also, as this contact probably would have been on. This brings to the fore once again the fact that it might be very useful for operators on that band to have some knowledge of who is QRV, and when, and with what. This Column is prepared to publish such information if readers will send it in. As a start, the writer believes the following stations to be active on the 23-centimetre band: G3MCS (Aylesbury), G2RD (Caterham), G8AGM (High Wycombe), G8AOD (East Grinstead), G3BNL (Gloucester) G3OXD (Birmingham), G3NNG (Wantage), G3GWL (Bletchley), G3UQK (Salford), G2WS (Weston-super-Mare), G3VYB (Liverpool), G8AOL (Bexleyheath), G8ARL (Newbury), G3MAR (Birmingham), GW3ITZ (Sealand), G8AUE

AFTER a long spell of desperately poor propagation conditions it was very pleasing to hear the Continentals coming in so well over the period March 5-8; DJ/DL was pounding in to the Midlands on the night of the 5th, and contacts at around 200 miles were being made quite freely. It was remarkable also that on that evening, and the following one, considerable ducting was in evidence. In the South-East of the country, the long-haul DX was hardly audible, although stations in the Bucks. and Berks. areas were heard passing S9 reports. Conditions on both Two and 70 cms. were good East/West, the ON4HN on the higher frequency band giving many a G his first Belgian contact. Activity to the South was poor for an opening like this, and comparatively few stations south of Paris were heard or worked, although G8ASR (Oxford) reports a contact with a station in the Bordeaux area and the oversea path to the Caen area was excellent. Saturday,

THREE-BAND ANNUAL VHF TABLE

January to December, 1969

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		TOTAL pts.
	Counties	Countries	Counties	Countries	Counties	Countries	
G3LAS	20	1	36	4	—	—	61
G3DAH	8	1	39	7	—	—	55
G8AUE*	—	—	28	2	14	2	46
G8BMD	—	—	28	4	8	2	42
G3COJ	—	—	24	3	11	1	39
G8APZ	—	—	21	3	9	2	35
G8ADP/A	—	—	25	2	5	2	34
G3AHB	—	—	20	4	3	1	28
GC8AAZ/P	—	—	22	4	—	—	26
G8APJ	—	—	19	1	4	1	25
G8AUN	—	—	16	6	—	—	22
G3EKP	6	2	3	1	—	—	12
G8BJC	—	—	11	1	—	—	12

This Three-Band Annual Table shows total claims to date for the year commencing January 1st, 1969. Claims should be sent as here-to-fore to: "VHF Bands," SHORT WAVE MAGAZINE, BUCKINGHAM. Summaries by bands will be published at suitable intervals.

*Note: G8AUE has four counties and one country on 23 cm also.

(Derby), G8AEJ (London), G5UM (Leicester), G8AUF (Derby), G8ACE (Hatfield) and G8ADC (Luton). There must be many more.

March Two-Metre Contest

Conditions for the two-metre contest over March 1-2 were only just average, and contacts over the 200-mile mark were very difficult to get. However, there was a gratifying increase in the activity level compared with the corresponding event last year, and this was due mainly to the advent of the G8/3 stations. A detailed check of the G2JF and G3DAH logs showed that just about 50% of the total number of contacts was with G8/3's and this sort of figure was confirmed by many other operators. Continental activity was surprisingly low when it is recalled that it was also the IARU Region I contest, over the same period. As far as can be ascertained there was only one German station coming through at anything like reasonable strength, and that was, inevitably, DLØER from Essen. Nothing appears to have been heard of the French stations south of Paris and, with the exception of a few strong signals on SSB, the PAØ's did not appear in their usual numbers or at their wonted strength. GDX was hard to get, and most paths were subject to severe fading, although pressure was fairly stable around the 1020 mB mark for most of the time.

In terms of good signal strength, quality and tidy operating, some outstanding stations were G8BLY (Winchester); G3SHK (Ruislip) with his very good SSB; G3RMB (Coventry); G8BBY (Rugby) who was heard calling a French mobile; G8ARL (Newbury); G3PWJ (Warley) on both AM and SSB; and G3BLP (Caterham), calling G3GZJ (Redruth). GW3NUE/P was heard only weakly in the South-East (which is unusual for him) and by far the best GW signal came from GW3TXR/P in Welshpool who, incidentally, must have put up a very fine score, as he was passing a serial number of 190 about 30 mins. before the end of the Contest. G8BBB (Ely) was another good signal and has a final score of 143. G3XP/P and G8BTT in Leicester were strong for part of the time, but their signals in Herne Bay

were anything between S2 and S9 at quite short intervals and yet with a constant beam heading. G3NGZ near Cheltenham, operated by the owner of the callsign and G8BII, was another consistently good signal in the South-East and their excellent operating techniques and full modulation must have contributed significantly to their total, which stood at 165 at 4 p.m. Some first-class operating also came from two newcomers, G8BUT and G8BVI, who not only had good quality signals, but also seemed to know what it was all about.

G8APV/P, on from Firlie Beacon in Sussex, reports hearing HB9AEB, I1BAF and I1EVK on the Sunday morning on the SSB channel. At that time I1BAF was giving a serial number in the 300's! A good question would be . . . was this Spor. E, extended tropo., or a legpull? G3SLJ, operating from Danbury, Essex, was plagued with flies on the Sunday. It seems that the 1 kW fire and the heat from the rig had hatched them out. But there were no flies on them from the score they put up! G3WGC, the Mid-Herts club, had a bit of excitement that cost them some working hours: they received a misleading report that they were operating on one of the guard channels, and this led to a sortie in the middle of the night to obtain another set of crystals. In the event, it was proved that they were at least 40 kc off the channel, and so in the clear. This was followed during the Sunday afternoon by a visit from a gang of hooligans who invaded the premises and smashed all the Club radio equipment. They still clocked up a score of 155 contacts though, which was very nice going.

G3LAS (Hertford Heath) with 156 contacts was a good signal all the time and must have been feeling pretty tired by the time it was over, as he was on throughout the whole 24 hours.

Many G stations were heard working FØCK/M on the Sunday morning. Operating the mobile was ON4PU with ON5LV plus a couple of SWL's. Several crates of Stella beer helped to produce some fluent English!

On the debit side there was the usual crop of badly over-modulated signals, gabbled callsigns without

any attempt to use phonetics, and unnecessarily lengthy replies to CQ calls. If an operator announces that he is tuning from 144.1 up, it seems quite pointless to call him for a minute on 144.2! VFO's were again used fairly indiscriminately by some people. It is acceptable that one should quit one's own Zone for a short period to try for a piece of choice DX tuning a limited section of the band, but it does spoil the distant, weak contact for others if continued out-of-Zone operation persists. There was a gratifying absence, this time, of phone signals in the CW area of the band.

By and large then, an enjoyable Contest with a high level of activity and a lot of crafty winking out to be done to knock up a good score.

DX-Peditions

G13RXV and G18AYZ are planning to go portable at Slieve Galleon, Co. Derry, 1,700ft. a.s.l. during the two-metre contest over May 3-4. They will be running 35 watts to a 10-ele Yagi. G13RNY is expected to be portable during the same contest, running 50 watts to an 8/8 from 1,100ft. a.s.l., site about 5 km west of Larne.

For those looking for elusive Scottish counties, an expedition to Lanark and Dumfries is on the *tapis*. G3OHC, G3NZS and G3TGL will be signing GM3OHC during the May two-metre contest, 3rd-4th. The site selected is 2,400ft. a.s.l., with a good take-off to the South, and is on the borders of the two counties, so who knows, it may be possible to get two for the price of one if they can move a few yards. Gear will be a 2N3819 FET converter into an Eddystone EC-10. The transmitter will be either a 640A or 750A with about 70 watts on CW, 60 watts AM phone and 100 watts SSB. The preferred mode is CW on 144.02 mc, with AM on 145.98 mc, or 145.93 mc as an alternative. SSB will be on the usual channel. Skeds can be made with G3OHC, *QTHR*, for times *outside* the contest.

Another chance to work some of the rarer GM counties is to be provided by the Dial House Radio Club, Salford, Manchester, who are making a two-metre trip over April 3-12. Itinerary is as follows: *Wigtownshire*, April 3-5; *Bute*, April

6-8; *Inverness-shire*, April 9-10; *Perthshire*, April 11-12. Frequencies 145.80 mc or 145.08 mc, signing GB2GM. Operators will be G3WFW, G8AMO, G8CDM and three SWL assistants. Gear to consist of two HW-17 transceivers, home-built Rx and SSB Tx and 6/6 slot-fed beam. A 160-metre station, also signing GB2GM, and operated by G3WFW around 1875-1880 kc, will come up after close-down on two metres and skeds can be fixed *via* this station, or directly in advance through G8AMO, Dial House Radio Society, 1st Floor, Dial House, Chapel Street, Salford, 3. It is worth a mention that all these chaps are GPO engineers!

Easter Week also sees an expedition to the West Country by G8BPY and G8APO. They will be operating in Devon and Cornwall from a caravan. Gear to be a triple-superhet Rx, with trough-line pre-amp into an FET converter, and a hybrid Tx with a 3-10 in the final, modulated by AD149's. Antennae a halo whilst on the move and an 8-ele Yagi when static. First operation is planned from Wiltshire on Friday around 144.15 mc, and then from points West. Coffee will be laid on for any visiting amateur who may wonder what that Minivan/Sprite-400 combination is with all the aerials! It appears that this expedition has been inspired by the sheer boredom engendered during the long hours both operators have spent in trying to work the West Country from the London QTH at 50ft. a.s.l.

Imperial College Radio Society will be signing GW5YC in North Wales over Agril 9-16. Two-metre operation will be on AM only, the transmitter running 30 watts to a ten-over-ten Yagi. Five operators and one SWL make up the party.

G3VUE and G3ROZ aim to put EI/GI on the two-metre map between June 8 and 22nd, when they will be trying SSB, AM and CW from *Wicklow, Waterford, Mayo* and *Antrim*. The transmitter will run full legal output on SSB and CW, and 90 watts on AM, to a pair of stacked Parabeams. G3VUE, *QTHR*, would be pleased to receive s.a.e. for skeds, and would like also to hear from anyone who could provide information on good VHF sites in these counties, and who can



The 8-ele flat-top used by GC8AAZ/P, Jersey, for two-metre operation from high ground in the north of the Island. Change of directivity is obtained by the simple process of turning the car round! The beam assembly breaks down into sections carried in the boot, only the roof-rack and two short uprights being fixtures. Many good cross-Channel contacts have been made by GC8AAZ/P on fine Sunday evenings.

say where it might be possible to hire a Land-Rover or similar vehicle during the tour.

Club and Group Activity

A South Bucks VHF Club has now been formed in the High Wycombe district. Meetings are held on the first Tuesday in each month at Bassetbury Manor, Bassetbury Lane, High Wycombe, and those interested are invited to write to the hon. secretary, G3PQH, *QTHR*.

The South-East UHF/VHF Group meeting on March 7 was held at University of Kent, Canterbury, when Ray Hills, G3HRH, talked about transmitting aerials for UHF/TV. As the designer of many of the masts erected for both the BBC and ITA, Ray gave a comprehensive review of past construction and present plans from the initial statement of the service area requirement to the final result. For those who may contemplate erecting a

decent mast for VHF/UHF, the cost of three 1,250ft. towers is around the £1m. mark!! The next meeting of the Group is at 7.30 p.m. on May 9 at Wye College, University of London, when the speaker will be Peter Blair, G3LTF, who will be expounding on the mysteries of Meteor Scatter and EME techniques. And who better?

The Leicestershire VHF/UHF Group had bad luck for their meeting scheduled for February 20. The violent snow storms had made it impossible for the lecturer to arrive, and many of the members were unable to get out of their homes. Some were telephoned or contacted on VHF and told that the meeting was off, but it must have been a great disappointment to them all to have missed G3MNQ, who was to have talked about "VFO's for VHF" on that occasion. However, all was not lost, and G3MNQ will be having another shot on April 17. He has built an FET

VFO especially for the occasion. Jack Hum, G5UM, *QTHR*, can supply further details of this and other meetings of this well-organised Group. The venue is again the Regional College of Technology, Leicester, and the time 7.30 p.m.

Special Events

As one of the many special attractions at the Lydd, Kent, Airshow over Easter, arrangements have been made to run an A.R.M.S. demonstration station from the airfield. Operation will be on two metres with a 10-watt transmitter and a 4-ele Yagi, SSB on the HF bands and a small AM transmitter/receiver on Top Band. The call will be GB2BAF ("British Air Ferries") and among the operators will be Captain Bill Ingle, G3OIZ. Talk-in facilities will be available, and for those mobiles who arrive operational and displaying a QSL card, entrance will be free. Among the events laid on for the Show will be static exhibitions by the three Services and, on Easter Monday, a flying display by the R.A.F. Red Pelicans and a dropping performance by the Red Devils Free Fall team. Time 2 p.m. to 6 p.m.

The programme for the Fifteenth International VHF/UHF Convention to be held at the Winning Post Hotel, Twickenham, on Saturday, April 26 from 2 p.m. onwards, has now been finalised. A change has been made in the arrangements this year, in that two lecture programmes have been organised to run concurrently, to cater for the newcomer to the bands and for the expert. Lecturers include G3BA on VFO's for VHF; G5UM on his well known "Quickstarters"; G3JVL on VHF phase-lock oscillators; G3HBW on VHF/SSB phasing rigs; G3MED on VHF receivers and G3FZL on measurement of IP's in SSB transmitters. The trade exhibition, raffle and display of home-constructed equipment remain as last year. Lunch is available in the Hotel. Whole-day Convention tickets, including the Dinner are 32s. 6d., from G3GMY, *QTHR*.

The Midlands VHF/UHF Convention and Dinner Committee have been able to arrange for G3NNG to address them on the occasion of their next gathering at Wolverhampton on June 14. His subject

will be "A new approach to VHF/UHF receiver design," a subject about which Des must know a great deal in view of the regularity with which his callsign figures in the lists of Contest leaders. All those who have already attended one of these conventions will automatically receive a programme and ticket application form for the event. Those not already on the list can obtain a programme from F. W. Wright, 20 James Road, Kidderminster, Worcestershire, and a ticket application form from J. R. Hartley, 30a Salop Street, Bridgnorth, Shropshire, on receipt of an s.a.e.

Two-Metre Activity

In G1: From G18AYZ (Ballymena) comes comprehensive news of two metre activity up there. Stations known to be active are: G15AJ (Bangor), on 145.88 mc; G15SJ (Belfast), 145.97 mc; G13SUM (Bangor), 145.88 mc, and SSB on the usual channel; G13IIF (Belfast), G13IJM and G13RNY (Antrim), all on 145.95 mc; G13RXV (Co. Derry) and G18AYZ (Ballymena), both on 145.83 mc, and G18BDR (Castle-

down, Co. Derry) on 145.90 mc. Saturday night, from about 9.30 p.m. onwards, sees most activity. G18BDR is usually beaming north, while G18AYZ turns towards Lancashire and Cheshire, as this sets his beam over activity centres in Belfast and Bangor. G12BZV (Belfast), is often active on Sunday mornings from a fine site above Belfast Lough, and with a 320A an a ten-element beam, should be putting a good signal into C G15AJ, G15SJ and G13SUM weekly sked with G3CCH (Scurthorpe, Lincs.) on Saturday evening at 9.30 p.m., and after that the local net starts up. G18BDR and G18AYZ are on the line-of-shoot to and from G over Belfast and callisten around during ragchew without having to turn the beam although no G contacts have as yet resulted. The idea that Friday night is Irish night seems to have died a natural death, possibly because conditions have been pretty appalling recently—but the idea is still there and it is well worth while having a look in that direction at that time. Two-metre activity by Counties, :



"... thought the old six-over-six would come in useful ..."

far as present information goes, is as follows:

Antrim —G12BZV, G13FFF,
G13RNY, G18AYZ,
G13IJM

Down —G13GXP, G13SUM,
G13IIF, G15AJ,
G15SJ, G13BNC

Derry —G13RXV, G15ALP,
G18BDR, G13TIJ

Fermanagh—G13RNO, G18AWF.

In GC: Many operators will have worked GC8AAZ/P in Jersey during the recent opening and perhaps been surprised at the strength of his signal. The answer is not to be attributed to good propagation alone, but more to the fact that Lawrence now has an 8-ele beam up on the roof of the Mini, rotated by turning the car (!), and, operating as he does from the highest point in the north of the Island, can lay down a fair signal right up to the Midlands. He is still active around 144.15 mc on most Sunday evenings from Sorel Point ("YJ60f") and is usually assisted by GC8CHJ, secretary of the local Club. Those who wish to contact GC8AAZ personally should note that his address is now: 9 Sunshine Terrace, Bagatelle, St. Saviour, Jersey, C.I., but as he expects to move again shortly, QSL cards go *via* GC3GS.

Some details of a recent expedition to Guernsey are now to hand. The operators were G3VUE and G3ROZ, using the call GCVUE/P and located at a point some 425ft. a.s.l. On the receiving side they had a TW Nuvistor converter tuning 28-30 mc and the transmitter was a TW2 running about 4 watts into 120ft. of coax and a 14-ele Parabeam. Conditions were extremely poor, with most G stations peaking just above the noise, and very few S9 contacts to be had. Best DX was with GW8BOQ in Monmouth, RS-56. G2JF was a consistent 5 and 9, and G3NGZ, from R.A.F. Little Rissington, was peaking at 5 and 7/8 and was worked with the help of a little aircraft flutter. Stations heard included G3PWJ, G3VTS/P and G3GDJ, up to RST-599 on CW. In all, some 40 stations were worked, most of them in Southern England. Neither GB3VHF nor F3THF were heard during the visit. Amateur Radio is really keeping these two

chaps busy as, apart from this trip and the GI/EI expedition already in hand, they are currently engaged in setting up a permanent station for VHF at Gilwell Park, Chingford, the International Scout Training Ground.

GC3DVC, the Jersey Club station at Fort Regent, St. Helier, is expected to be ready for VHF before too long. They already have gear for the HF bands, but antenna rotation is going to be a problem on VHF. However, they *are* building.

In PAØ: For parchment hunters, a "Worked all Dutch Provinces" Certificate is now available. This is awarded for QSO's since January 1, 1969 with the eleven Provinces of Holland, and can be made on each amateur band separately, or a combination of bands. Claims, with 10 IRC's, should be sent to the VRZA Certificate manager, Post Box 190, Groningen, Holland after authentication by two licensed amateurs. For the benefit of those who may want to have a go at this, the Provinces are: Groningen, Friesland, Drente, Overijssel, Gelderland, Utrecht, Noord Holland, Zuid Holland, Zeeland, Noord Brabant and Limburg.

Still in Holland, several new stations have recently appeared on two metres, among which are PAØGSM, PAØVVB, PAØAWH, PAØJGF (on SSB), PAØDUO, PAØVVH, PAØOHN, PAØEHL and PAØKHS. PAØWLB, not by any means a newcomer to the band—he has worked nineteen countries now—recently heard HG6RD while taking time off from his M/S skeds with OH1NL.

In ZB2: ZB2BC and ZB2BO have been hearing ZE1AZC on 50.046 mc almost every day and evening *via* F2 and TE, and on February 19, ZB2BC found the beacon ZS6VHF on 50.1 mc at 59+ around 1615z. On March 2 at 1255z, ZS6VHF appeared at 559 and the ZE beacon was audible between 1308z and 1420z, and ZB2BC then worked ZE1AN at RST 559/54 at 1415z, and ZE1JJ at 1440z, RST 339. On March 5, he raised ZS3B, 1945-2005z, and on the same day there was QRM with ZS3B and ZE7JX sharing the same channel, but unaware that the band was open!

On Sunday, March 9, 1445-1615z, ZB2BC contacted ZS3B,

ZE1AN and ZE7JX, the ZE's having to be alerted, after a *fort-night* of the ZE1AZC opening, by letter! ZB2BC hopes to try 70 mc tests with ZS shortly. The openings have shown that there are 50 mc (6-metre) chances almost every evening from ZB2 to ZE *via* TE, with occasional F2 openings during the day. The lack of VHF interest in Africa is limiting QSO's, especially with ZS6.

VHFCC Awards

Only one Award this month, and that goes to Mike Payne, G8AYF for operation on two metres. Congratulations. Mike runs a home-built transmitter using a 6AK5 oscillator on 24 mc, 6AK5 tripler and EL95 doubler which drives a QQV02-6 and QQV03-20A to 14 watts input. His converter was an E88CC cascode type, as described in the September, 1963, issue of SHORT WAVE MAGAZINE, preceded by a Nuvistor pre-amp, but this has now been replaced by a GMO 290 version feeding into an Eddy-stone EC-10. The beam used to be a 4-ele flat-top, now substituted by an 8-ele job at 30 feet. The QTH is about 230 feet a.s.l., but is surrounded by high ground which, while not affecting two-metre operation too much, plays fair old havoc with 70 cm.

Readers are reminded that claims for this Award may be submitted for operation on Four, Two or 70 cm and that proof of QSO's with 100 different stations on each band is all that is required. Details were given in the May, 1968, issue of SHORT WAVE MAGAZINE.

News Items

Don Hayter, G3JHM, perhaps best known for his work on four metres, has been very active on Two of late. He has knocked off 70 French stations since the beginning of the year, best DX being F9FT in Rheims and F3UI in Le Mans. He also had a contact with F5NS while the latter was running less than one watt output and who was receiving Don with a pencil stuck into the converter input terminal. (Not quite sure why he should suddenly try this!) On 70 cm best DX was with F9ZG/P on Mont Pincon, Calvados.

G8BGV is now G3YDY (Chelms-

ford) having just got his ticket through before his B Licence was due for renewal. He was heard bating away on the key during the recent opening on two metres. G8BLG is now equipped for RTTY and would welcome skeds, as would his neighbour in Horncastle, G8BNW. Great efforts are being made by G3BA *et al* to put a two-metre SSB signal into GD where GD3FOC is poised over a hot receiver. A test on March 3 seemed to have staggered GD3FOC somewhat, as he had not bargained on quite so many calls in such a short time. He logged G3CCH (Scunthorpe) and G3NEO (Sheffield) and heard a spate of others which, in the time available, he could not positively identify. It is possible that by the time this is in print, he will be able to transmit SSB also.

It was good to hear G3NOH on VHF once more, this time from an *ad hoc* meeting of the Verulam Radio Society, who were being introduced to the possibilities of low-power SSB by G8BNR. After a long spell in and out of hospital, George is cheerily active if not quite on his own two feet again. G8BLD (Norwich) is putting out a nice two-metre signal and has plans for going up and down in frequency, HF to 23 cm. G8BQX (Hastings) and several others have had good QSO's around the S 8/9 with F5NS in Caen. Not surprising? But F5NS was only running 500 milliwatts to a $\frac{1}{4}$ -wave whip at the time. G8AZU and Co. will have to look to their laurels! David Evans, G3OUF, is not expecting to be active on any band for some time to come as he has just started his pilot training at the Hamble School. Is there an airfield on Sark? G8CBU (Luton) has a new shack in the garden and will be much more active on the bands than he has been recently. G8ABA (Leicester) is now building from scratch for two-metre SSB; the transmitter will run a QQV06-40A linear into a pair of 4X150A's. The SSB

generator is a ten mc filter job; and the linear will cope with NBFM and AM also. The converter has TIS88A RF and 2N3819 mixer stages, and the antenna will be a ten-element *J-Beam* Skybeam at 45ft., so he should be able to hear 'em and work 'em.

* * *

Paul O'Brien, G3DNR (Broadstairs, Kent) comes up with an interesting comment. Of his first 100 stations worked on two metres, 80 were Europeans! Of course the QTH lends itself to EU contacts, but even so this is good going with only five watts to a QQV02-6. The site at 170 feet a.s.l. looking out over the Channel, and the 8/8 at 40ft., help to maintain a regular sked with F2XO at Boulogne on the first and third Thursday in each month, with signal strengths usually at RST 579 both ways.

G3QG (Luton Hoo, Beds.) is having TVI trouble and is not very active at present. However, he is well on the way to a cure, and would welcome DX skeds and reports. Those who do work Bill will get an acknowledgement in the form of one of his hand-painted QSL cards which, from personal observation, can be vouched for as being most decorative. He did manage to get on during the last two-metre contest, and had some useful contacts with his seven watts to a *J-Beam* Turnstile. He would have made more had he noticed that the mike was unplugged for part of the time!

Those looking for Glamorgan on Two might like to keep an ear cocked for GW8CGN (Llantwit Major) on 144.38 mc during the vacation period March 22 to April 22. The transmitter is fairly QRP, with only five watts to a QQV04-7, but plans are in hand to change this for an 829B running some 60 watts or so to an 8-ele beam. Skeds can be arranged by s.a.e.

* * *

It is pleasing to record another father/son combination on two metres. Geoff Barnes, G3AOS (Hale Barns, Cheshire) has been joined by his son Robert, who has been issued with the call G8CJQ. Having passed the R.A.E. with flying colours, he is now studying for his G3/3 (or is it G4?) licence. The OM himself has not been very active of late, but will be out Portable and Mobile during the summer months looking for the two counties he still needs to give him his century on Two.

G3VQL (Shrewsbury, Shropshire) has a moan about the G3BA/G3BHT expedition to GM and suggests that the arrangements are too regimented. To quote from his letter "... I presume we shall have the usual comments about sked holders (you lucky people) queueing up like squads of well-trained soldiers. No, this stuff is not for me..." *Oh, well!*

A/TV: GM3ULP/GM6ADR/T (Motherwell, Lanarkshire) is now radiating a test signal on 437.28 mc. Camera is a Vidicon with 625-line output, screen modulating a QQV02-6 running eight watts peak white, and operation is on most evenings.

Contests

Forthcoming contests include the Second 70 mc (Open), over April 12-13, and Fourth 144 mc (Portable), May 3-4, the latter to coincide with the IARU Region I fixture.

The DARC have an SSB event scheduled for 2100z April 19 to 0300z April 20, and again 0700-1300z on April 20, presumably to give a rest period.

Deadline

Deadline for the next issue is April 5, and the address for news, comments and claims is: "VHF Bands," SHORT WAVE MAGAZINE, BUCKINGHAM. Cheers for now and 73 de G3DAH.

"Short Wave Magazine" carries more paid Small Advertising of radio amateur interest than any similar periodical circulating in the U.K.—See pp.120-127 in this issue.

SOPHISTICATED CAR ALARM CIRCUIT

PROTECTING THE MOBILE
RIG

N. E. A. RUSH (G3HBZ)

THE original idea of a simple anti-thief alarm, from which this more sophisticated version developed, was described in the February, 1965, issue of *SHORT WAVE MAGAZINE*. In the first place, the circuit, reproduced in Fig. 1, consisted merely of the addition of a heavy duty DPDT switch which, when operated, connected the car horns to the courtesy light switch—and the primitive “alarm” sounded. This device was easy to install and was intended to be a deterrent to the casual thief and as such it was quite adequate.

However, with the purchase of a new car and the installation of more valuable /M equipment, it was considered that some additional refinements were desirable. The main practical shortcomings of the shorting-switch principle seemed to be:

- (i) Although the alarm sounded when any of the car doors were opened, it also ceased as soon as the door was closed again.
- (ii) If the door was left open by the intruder, the horns sounded continuously. This could result in the “alarm” being ignored by those within earshot because they attributed it to a probable

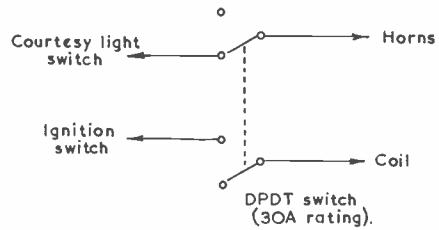


Fig. 1 Original alarm device

Q
401

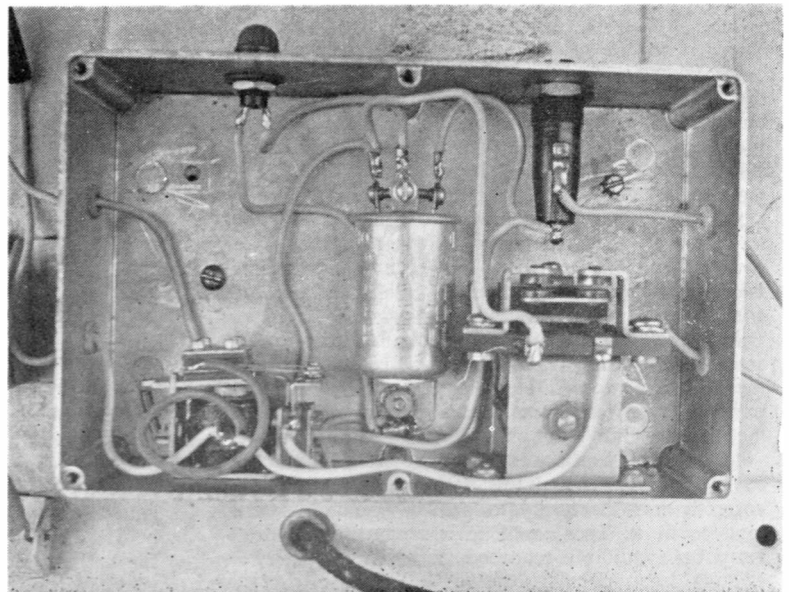
wiring fault and consequently did not investigate.

- (iii) The horns, which pass a fairly heavy current, were connected directly to the 12-volt supply and earthed via the courtesy light switch. If the alarm was set off and gained no attention the battery would rapidly be discharged.

After some deliberation, the circuit overleaf was evolved and the prototype actually in use in the writer's vehicle is shown in the picture here. The new unit overcomes the original objections listed because:

- (a) By means of a self-holding relay, the alarm, once it has been actuated, continues to operate however quickly the door is closed again. As the “hold” contacts are virtually in parallel with the courtesy light switch, the interior lights remain on while the alarm is operating.
- (b) By using the standard type of indicator flasher unit, suitably loaded current-

Construction and mounting of the car alarm unit. It is fitted on the bulkhead separating the engine from the driving compartment, and for this view the cover completing the assembly has been removed—see p.110 overleaf for circuit.



wise, the horns are sounded intermittently. This regular horn-blowing has been found to obtain attention very much more readily,

- (c) If the battery voltage drops below that required to hold in Relay A, the system stops and in any case the on/off duty cycle of horn blowing is less arduous on the battery than the continuous load.

If the car door is left open after actuating the alarm, the "hold" contacts on RLA1 are shorted by the courtesy light switch, thus preventing the conditions in (c), but in practice the first attention the alarm has gained has resulted in the door being closed in an attempt to stop the awful noise!

Installation

Basically, the alarm unit, which is mounted on the engine compartment firewall, consists of a control relay RLA1 (of the double-pole, change-over variety), a 42w. indicator flasher and a second relay RLB (a single-pole make/break type which switches the horn circuit). Of course, the relay contacts *must* be heavy duty quality and capable of carrying the current involved comfortably. Those used in the original model are surplus ones and were obtained for a few shillings each from the advertisers in *SHORT WAVE MAGAZINE*. In addition to these items, which were built into a diecast aluminum box as a protection against grease and dirt, a "secret" operating device is required. This can take the form of concealed toggle switch, S1, a rotary switch with the control knob removed as a key, a two-pin mains socket with a shorting plug, or a key-operated switch which can be the usual ignition type recovered from a written-off vehicle at the local car breakers. This can be mounted in some concealed exterior position, such as on the radiator grille.

Only four external connections are necessary. Two to the horns—the "live" side provides the relay operating voltage, the "cold" side to switch the horns—one to the courtesy light switches and one to the reversing lamps, or other lamp load as explained later. As will be seen from the diagram in Fig. 2 here, when the alarm is switched on, 12v. appears at the cold ends of the relay energising coils and these are commended to the courtesy light switches. If any car door is then opened, these switches apply an earth to the common point and the relays operate. Contacts A1 maintain an earth connection to both relays—and to the courtesy lights themselves—so holding the alarm in the actuated condition until switch S1 is opened and the system restored. The A2 contacts connect the car reversing lamps to the appropriate point on the flasher unit—to which RLB is also connected—so that the horns and reversing lamps hoot and flash in unison! For the flasher unit to function correctly it is necessary to provide a nominal 42w. load to fit it. This could be a separate 40w. head-lamp bulb, suitably mounted, or as in this case, an existing lamp circuit borrowed *via* contacts A2. A

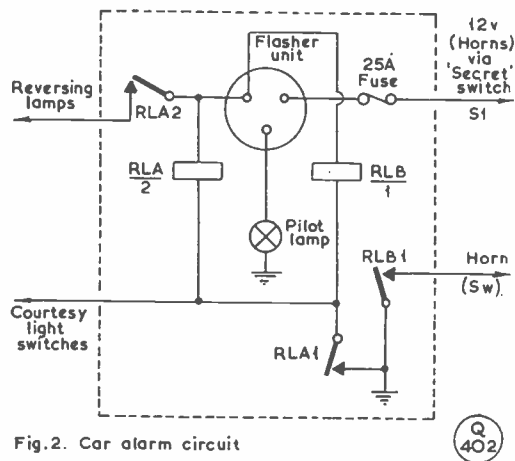


Fig. 2. Car alarm circuit

pair of reversing lights, each of 21w., have been fitted to the writer's vehicle and they load the flasher unit exactly. The pilot lamp connection to the flasher unit is brought out to a red indicator lamp on the outside of the unit.

Caution!

One final point—the idea of using the motor vehicle's own horns as part of an audible alarm is a feature of several commercial products. Would-be car thieves and vandals are aware of this and by quickly lifting the car bonnet and wrenching off the horn connections this type of alarm can be effectively silenced. It is well worth while, therefore, to replace the standard connectors to the horn(s) with hefty soldered joints. Generous fusing arrangements will obviate any consequent risk from possible short circuits.

Though this alarm has been installed for over twelve months now it has so far not been sounded in anger, although it has twice caused blushes when, through forgetfulness, the unit has been triggered on returning to the car to drive home!

GB2HEH—A ROYAL OCCASION

For the Investiture of the Prince of Wales at Caernarvon Castle on July 1, a special-activity station is to be established, signing GB2HRH, for the period June 28-July 6 inclusive, working all bands 10-160m., mainly SSB. The station will be installed in a fully-equipped caravan, and sited in the Snowdonia district—but will not be on view to the public, as it will be on private property. Operators are to include GW's 2HFR, 3IEQ, 3NWV, 3OXU, 3VBX, 5YB and G3WET.

Schedules are invited with stations throughout the Commonwealth, particularly with Welsh-speaking operators, as there will be opportunities for contacts in that language. A special commemorative QSL card is being issued, and further information (s.a.e. essential, pse) can be obtained from: J. G. Evans, G3WET, 22 Sheerifoot Lane, Four Oaks, Sutton Coldfield, Warwickshire—who will also be glad to fix skeds.

THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for May Issue: April 4)

(Please address all reports for this feature to "Club Secretary," Editorial Dept., SHORT WAVE MAGAZINE, Buckingham.)

A COMMENT in one of the Club newsletters is possibly well worth enlarging upon at this time. This is the matter of catering for the SWL interest and is very important for the well-being of a flourishing group. One of the points is to make sure newcomers get a welcome into the Club and are introduced. But, just as important, it would seem necessary to guard against any outbreak of piracy among the junior membership! It seems a fact that a serious attempt to cultivate the SWL interest can lead to an excess of juniors, some of whom clearly have little real interest in the hobby, and then to an outbreak of piracy by some of them. The writer has seen this happen in several groups at one time or another—and a case has been reported for this very issue—and can only say that it always leads to grief, sometimes to a prosecution, and invariably to a set-back for the Club concerned.

There must be groups around the country where this problem has been met and coped with successfully. We would like to know how?

The Reports

Cornish are first, and here we have a group which caters for a large slice of territory indeed. To cope with all this, there is a main meeting at the SWEB Clubroom, Pool, Camborne, which is down for April 3 and is the AGM. In addition there is a Falmouth sub-group, another at Newquay, also VHF and SSB groups. For the details on the latter meetings, we have to refer you to the hon. sec., the more so as the VHF crowd have moved Hq. to the People's Palace, Pydar Street, Truro, which looks from the map to be a bit tricky to find. Newquay group is at the Treviglas School, Newquay, every other Wednesday.

At Worcester, the lads have Hq. at 30 Perdisswell Park, Droitwich Road; we have no details of the programme at this moment, but understand that some "sorting out" is going on at the time of writing. Thus a contact with G3TQD seems indicated—see Panel, p.114.

GC might be rare DX for the county-chasers on Top Band, but there is no doubt that in Jersey there is a very active and lively club to maintain enthusiasm, on all bands and radio amateur activities. They get together at Fort Regent on Sunday mornings, and Monday, Wednesday and Friday evenings. The "main" meetings are on alternate Fridays, which gives April 11 and 25. The former is a talk on Workshop Practice, and the latter a Bring-and-Buy Sale. There is a good Hq., with a separate space for the rig, a lecture room,

and a small storeroom in addition, which everyone seems to be helping to smarten up and make comfortable. A Newsletter is also put out to keep members in touch with one another and the various activities.

From where we sit, it rather looks as though the Surrey April meeting will be on April 15 at the Swan and Sugarloaf, South Croydon, when the AGM is to be dealt with. However, we have no certain information owing to the Surrey newsletter being momentarily "out-of-phase" with our deadlines, so a call to the hon. sec. would be a sound way of making sure—see Panel.

Midland next, where it seems they are to watch a demonstration of Amateur TV, which will be given by G6MXW/T; this will be at the MARS place at the Midland Institute in Margaret Street, Birmingham.

Most of the RN and ex-RN amateurs are members of the Royal Navy ARS, whose newsletter this month carries a rather interesting piece on the development of Naval communications, as well as much else of concern to the membership.

In Bishops Stortford the lads will be getting together on April 21 to see the WIBB tape-and-slide talk, in the Mk. II version. The venue, as always, is the British Legion Club, in Windhill, on the A120 road going out of the town towards Ware, just before the fork.

Acton, Brentford and Chiswick use the Chiswick Trades and Social Club as their Hq., at 66 High Road, Chiswick; here they will be gathering on Tuesday April 15 for a talk by an engineer on the staff of the Vero organisation about the uses of *Veroboard*. Non-members interested are of course cordially welcome.

The Cray Valley lads have two places where they meet; April 3 sees them at the Congregational Church Hall, Court Road, Eltham, for the AGM, but on the 14th the Natter Nite is taken at All Saints Church Hall, Bercta Road, New Eltham.

* * *

Nice to hear again, after an absence, from Harrow, where a lecture on RTTY is down for April 11, a Practical Evening for April 18, and the all-important Junk Sale rounds things off on April 25. All these events take place at Roxeth Manor School, Eastcote Lane, South Harrow where they are to be found every Friday evening, whether a formal programme is announced or not.

A real attraction is on the East Worcs. bill of fare this month. They are to see the Burroughs Corporation film of the first manned flight into space, which has the daunting title "Highway to Eternity"—sounds a bit like a Hitchcock thriller film! This one is at the Old

People's Centre, Park Road, Redditch, kicking-off at 8 p.m., on Thursday April 10.

Not very far away is Solihull, where the chaps have a place at the Old Manor House, 126 High Street. April 15 is slated for G5AER/W2IRS to discuss the ins-and-outs of Amateur Radio in the United States.

The hon. sec. of Southgate—see Panel—writes in to advise that they have shifted their Hq. to the Civil Defence Hut, Bowes Road, Arnos Grove, where they will be getting together as and from the March meeting. For all the details on their doings, and how to find them, drop a line to G3XSV.

It rather looks like the third Wednesday in the month for Verulam and the venue is the Cavalier Hall at St. Albans. The full details are not, at the time of writing, to hand, but no doubt the new hon. sec., G3NCK, would be pleased to pass on all the relevant information. We can say that here is one of the liveliest and most active Clubs in the South of England, with a team-spirit which would be the envy of many other groups.

North Kent get together at the Congregational Church Hall, adjacent to the Clock Tower in Bexleyheath. Here the form seems to be the second and fourth Thursday in each month, and there is usually something of interest going on. For the latest story, we have to refer you to the secretary, as we believe there has been a change of programme.

Talking of changes of programme, we have a buzz that this might also have happened at Echelford, who have booked the Hall, St. Martins Court, Kingston Crescent, for April 24. As the AGM occurs on the day before this issue comes out it is possible there will be a new hon. sec., but no doubt the present incumbent—see Panel—would be pleased to pass on details of the forthcoming attractions.

Mondays are favoured at Norfolk, at the Brickmakers Arms, Sprowston Road, Norwich. April 7 is the Bank Holiday and so is scrubbed from the programme, but on the 14th they have a Ragchewing session; on the 21st a talk on RTTY; and on the 28th a lecture.

Having to leave their old Hq. has been a blessing in disguise for the Salop boys; the group has taken on fresh impetus and drive since moving to the new place, and is attributed mainly to the more frequent meetings. April 3 is down for Club activities; the 10th for a Junk Sale; 17th for the club activities again, and the 24th for the Construction Competition, which will be adjudicated by G3PWJ. Incidentally the "Club activities" include all sorts of things, in particular, operating the Club station.

At Fulford the lads have just got through their first year, and can look back on a satisfactory start; they get together every Tuesday at a Hq. at the rear of the Social Hall, and have a varied programme of things to do and lectures to listen to. For all the details, contact the hon. sec.—see Panel, p.114.

Active London Group

All who work in the Civil Service are entitled to join the Civil Service Radio Society. In addition to the

Newsletter, they have two meetings a month, a separate room for the station and for the lectures, a bar, and somewhere to get a bite to eat at a very cheap rate before the meeting starts. All this, and much more is available at the Civil Service Sports Centre in Monck Street, London, S.W.1, there they have their Hq. April 1 is down for an informal, while on April 15 a Film Evening is planned. Another CSRS activity is the meeting, on or about 3625 kc at 6.30 p.m. on Friday evenings, which is for the benefit of their country members. A current problem to be overcome is with the aerial—though its coax feeder is 300ft. long (up through ducts and trunking from a basement shack), the aerial itself is only about 30ft. above street level, and has to be raised and lowered again for each session on the air.

Having heard of attempts to form a group, particularly in an area of low amateur population, one is always pleased to hear that the Club has come to life and is operating. We now know the Border ARS is a going concern. The Cross Keys at Kelso is the Hq., April 13 at 2.30 p.m. is the date and time, and "Aerials" given by G6UC, the subject for the lecture.

It is not so very long ago that we were making similar noises in regard to the Dunstable, Downs gang, who have just finished their first year of existence with an AGM attended by 53 paid-up members, no less, as well as several visitors. Chews House in Dunstable is Hq. where there are weekly sessions. April 4 and 18 are set aside for Morse and the Constructional Project, while G2MI has April 11 to discuss his W/VE trip; doings for April 25 yet to be arranged.

R.A.I.B.C. have an interesting piece by G6TQ discussing his activities over the past year in their newsletter *Radial*. This club has to get together by way of the 3.5 mc band—Tuesdays at 10.00 a.m., Wednesdays at 1400, and the Cheshire Homes net on Thursdays at 1400, all clock-time and all on or near 3.7 mc.

After a rather bad period the Leeds crowd have started a revival, and are staging a grand opening on April 16 at their old Hq. at Swarthmore Educational Centre, Woodhouse Square, Leeds. For the future a programme is being arranged which will include a series of talks for the beginner and the R.A.E. candidates. Let us hope sincerely that this revival of an old Club with a long history will be a great success. For details, contact G4AD at the address given in our Panel.

On now to Crystal Palace, who get together at Emmanuel Church Hall, East Dulwich, London, S.E.22; on April 19 at 8 p.m., G3BPT is to give a talk on RAEN, of which he is chairman of the committee. On May 17, the lecture will be on Colour TV, by G3NGS.

* * *

A couple of extra-territorial groups next; first of these is British Railways, which caters for those members of the Railways Service who are interested in Amateur Radio. In its turn, this crowd have an affiliation with the International Railway radio-amateur group, known as FIRAC, which has members in 24 countries. Most of these countries are represented at one time or another

"Short Wave Magazine" was established in 1937, is still entirely independent, enjoys the support of radio amateurs throughout the U.K., and goes to all English-speaking countries overseas.



The gathering for the Fareham & District Radio Club's 4th annual dinner on February 7, at the Red Lion, Fareham, Hants. Out of their 50 members, 24 are licensed—and five years ago they only had three tickets in the Club! At the top table, standing, are G3VLY (chairman, Fareham), G8BUJ (guest from neighbouring Gosport), G2QK (president, Fareham), and G3VFI (hon. sec., Fareham).

in the FIRAC nets. Details can be obtained from the hon. sec.—see Panel, p.114.

The other one is the R.A.F. Amateur Radio Society, for all serving and past R.A.F. types. Apart from the usual nets, newsletters and so on, suitable QSL cards are available, and various other services of a useful nature. The Hq. is at R.A.F. Locking, Somerset, where their Hq. station G8FC is maintained.

GPO engineers in the Manchester area have their own Club—Dial House Radio Society—and will be using the first fortnight in April for a DX-pedition to Scotland, leaving Manchester on April 3 and returning on the 13th after operating in Wigtownshire, Isle of Bute Inverness-shire, and Perthshire, both on VHF and the LF bands. The idea is to create interest in their Club, and if possible to gain more GPO members; details of the group and sked arrangements for the expedition can be discussed with the hon. sec.—see Panel.

How times flies—here is your old scribe huddled up over the electric fire typing his piece with temperatures near freezing-point, and in comes a letter from Bradford which says that on April 1 there is to be a Surplus Equipment Sale and on 15th a whole evening devoted to Field Day arrangements. A warming thought indeed!

Down in Wales

University College of Wales are having an open evening on April 29 to which visitors will be welcomed. It is to take the form of a Stereo and Hi-Fi demonstration in Lecture Theatre A of the Faculty of Applied Sciences, parking for cars being available on the campus. The chaps visiting are requested please to arrive early as it is hoped there will be a capacity crowd, and 7.30 is the advertised starting-time. In addition to this "open" event, advance warning is given that on June 22 all the D/F experts should be heading for the Gower National Park where University College Swansea are having the Annual D/F Hunt. Further details will be given later.

Edgware have Hq. at St. Georges Hall, 51 Flower Lane, Mill Hill, London, N.W.7. Here they have an interesting topic for April 14, when G6OUO/T is to talk about VHF, and possibly set up a live demonstration of Amateur TV as well. April 28, by contrast, is an "informal." The Club call is to be re-activated as soon as some aerials can be erected, and in the summer it is proposed to run D/F events, weather always permitting, of course.

At Chippenham, the form as always is a weekly get-together each Tuesday, at Chippenham High School for Boys, Hardenhuish Lane, Chippenham. April 1, with due note being taken of the implication, has been set aside for a Junk and Surplus Sale. On April 8 comes a talk by G3XFJA on simple Fault-finding and Alignment which will be carried on at fortnightly intervals thereafter. April 15 is the first "outside" event of the summer season—D/F Hunt—and on the 29th the all-important matter of the AGM, at which every member is expected to be present.

A move to new Hq. is on for Stockport, the place being Brookfield Hotel, Wellington Road South, Stockport, and the dates the usual alternate-Wednesday pattern they have kept to previously. Thus, April 2 is down for a talk on The Quartz Crystal by Mr. T. McKnight of Crystal Electronics; April 16 for Mr. Clark of Marconi to talk on Radio Communications, while April 30 is a Surplus Sale.

At Coventry they have meetings each week, and use alternate ones to put the Club gear on the air and have lectures—so, we find April 4 and 18 devoted to the rig, April 11 to a talk on Radio Navigation and April 25 to a talk about *Veroboard* by Mr. Woodhouse of the Vero organisation. For details, venue, and other information, contact the man in the Panel, on p.114.

Tough they must be at Purley—no less than 25 members turned out for the meeting on February 7, which, it may be recalled, was the night of the big blizzard. Although the show broke up rather earlier

than usual to let everyone get home, some of the chaps took as long as 4½ hours to reach base. And this, mark you, for a Natter evening! Turning to the forward programme, we can say that the first and third Friday in each month is the form, at the Railwaymen's Hall, 58 Whytecliffe Road, Purley. However, April 4 is Good Friday and so the meeting is cancelled; the evening of April 18 is left open for completion of the Junk Sale which was started at the March meeting! Incidentally, this must be one of the most successful clubs in the country; they have 100-plus members and new ones joining every month.

Wimbledon are Purley's nearest neighbours and so they slot their meetings into the alternate Fridays left blank by Purley; venue here is the St. John Ambulance Hall, 124 Kingston Road, South Wimbledon. They have been having a bit of trouble with over-enthusiastic youngsters operating pirate "pop" stations on the MW band! But the G.P.O. brought five tracking monitors into action—and that was that!

* * *

Cardiff Graduate and Student section of the I.E.E.

are holding an open meeting on April 1 at Llandaff College of Technology, Western Avenue, Cardiff. The lecture is to be given by GW3MOP and his theme will be, of course, Amateur Radio. Demonstration is always part of a well planned talk, and we gather that GW3MOP will do just that with assistance from others. Anyone in the area who wishes to be in on this will be very welcome. Be there by 7 p.m.

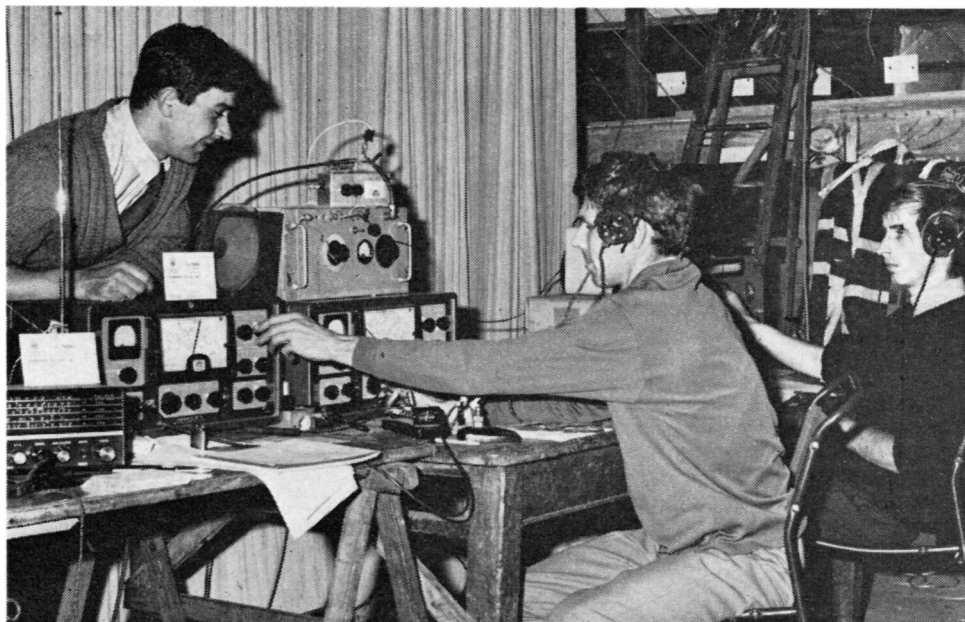
Dorking have their informals at the "Wheatsheaf" and lecture meetings at the "Surrey Yeoman." Thus April 8 is at the former venue, and on April 22 the latter, to hear a lecture on Integrated Circuits.

The Exeter crew seem to be on the up-and-up, with attendances becoming so high that thoughts may have to be turned to larger Hq. April 1 is the next date on their programme, when they are to have a lecture-demonstration by the *Veroboard* people, starting at 7.30, at St. Sidwell's Methodist Committee Room, Sidwell Street, Exeter.

At Kingston, April 9 is the date to reserve, and the topic for the evening is intriguingly titled "Bolt-on Goodies for the Receiver," referring to accessories to improve performance by simple devices. This one is

Names and Addresses of Club Secretaries reporting in this issue:

- ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, Acton, London, W.3.
 BISHOPS STORTFORD: A. Stanley, G3WUR, 43 Havers Lane, Bishops Stortford, Herts.
 BLACKPOOL & FLYDE: J. Boulter, G3OCX, 175 West Drive, Cleveleys, Blackpool.
 BORDER COUNTIES: J. Nairn, 5 Murrayfield, Gordon, Berwickshire.
 BRADFORD: P. Dewhurst, G3VFR, 80 Ley Fleaks Road, Idle, Bradford, Yorks.
 BRITISH RAILWAYS: H. A. J. Gray, Eleven, Swanton Drive, East Dereham, Norfolk.
 CHIPPENHAM: N. Cutter, G3PQG, 1 Fossey Close, Colerne, Chippenham, Wilts. (Box 664.)
 CIVIL SERVICE: D. McLennan, G3KGM, 52 Pinewood Avenue, Sidcup, Kent. (01-300 0767.)
 CORNISH: W. J. Gilbert, 7 Poltair Road, Penryn, Cornwall.
 COVENTRY: C. Jaynes, 20 Belgrave Road, Wyken, Coventry.
 CRAY VALLEY: D. Buckley, G3VLX, 234 Halfway Street, Sidcup, Kent. (01-850 6945.)
 CRYSTAL PALACE: G. M. C. Stone, G3FZL, 11 Liphook Crescent, London, S.E.23. (FORest Hill 6940.)
 DIAL HOUSE: B. Clark, G8AMO, Dial House Radio Society, 1st Floor, Dial House, Chapel Street, Salford, 3.
 DORKING: R. Greenwood, G3LBA, 8 Deacon Close, Downside, Cobham, Surrey.
 DUNSTABLE DOWNS: A. Don, G8BWZ, 51 Manor Park, Houghton Regis, Dunstable (67349), Beds.
 EAST WORCS: R. J. Mutton, G3EVT, Summerhayes, Mill Lane, Alcester (2140), Warks.
 ECHELFORD: M. Clift, G3UNV, 45 Fordbridge Road, Ashford (59628), Middx.
 EDGWARE: E. H. Godfrey, G3GC, 15 Oxenpark Avenue, Preston Road, Wembley, Middx.
 EXETER: G. Wheatcroft, G3HMY, 27 Lower Wear Road, Countess Wear, Exeter, Devon.
 FAREHAM: J. A. Rampton, G3VFI, 23 Oxford Close, Fareham, Hants.
 FARNBOROUGH: B. Woodfield, G3REL, 538 Rosemary Lane, Blackwater, Camberley, Surrey.
 FULFORD: G. B. Widnall, G3XJJ, 5 Heslington Croft, Fulford (77501), York.
 GUILDFORD: A. Wilkes, G3SLH, Schiehallion, Hookley Lane, Elstead (2150), Godalming, Surrey.
 HARROW: R. H. Medcraft, G3JVM, 134 Dulverton Road, Ruislip Manor, Ruislip, Middx.
 HEREFORD: B. Edwards, G3RJB, 5 Powys Walk, Hereford.
 JERSEY, C.I.: T. Morrissey, Darlington, Bagot Road, St. Saviours, Jersey, C.I.
 KINGSTON: M. Diprose, 36 Tiverton Way, Chessington, Surrey.
 LEEDS: W. Ripley, G4AD, 436 Meanwood Road, Leeds LS7-2LP.
 LIVERPOOL (UNIVERSITY): S. J. Dean, GW8CGN, Students Union, 2 Bedford Street North, Liverpool.
 MAIDENHEAD: E. C. Palmer, G3FVC, 37 Headington Road, Maidenhead (20107), Berks.
 MAIDSTONE YMCA: W. E. B. Kent, G3YCN, 72 Bower Mount Road, Maidstone (57634), Kent.
 MID-HERTS: H. R. Thornton, 43 Fordwich Road, Welwyn Garden City (23163), Herts.
 MIDLAND: R. Partridge, 42 Maxstoke Road, Sutton Coldfield, Warwickshire. (021-354 5921.)
 MID-SUSSEX: E. J. Letts, G3RXJ, 87 Meadow Lane, Burgess Hill, Sussex.
 NORFOLK: M. J. Cooke, 76 Falcon Road West, Sprowston, Norwich (46093) NOR-73R.
 NORTHERN HEIGHTS: A. Robinson, G3MDW, Candy Cabin, Upper Brockholes, Ogdon, Halifax (44329), Yorkshire.
 NORTH KENT: P. T. Baber, 64 Latham Road, Bexleyheath, Kent. (01-303 8655.)
 PUDSEY: P. Conway, G3XLV, 10 Tyersal Grove, Tyersal, Bradford (64220), Yorkshire.
 PURLEY: A. Frost, G3FTQ, 62 Gonville Road, Thornton Heath, Surrey CR2-6DB.
 RADIO CLUB OF SCOTLAND: A. Ritchie, GM3WYL, 21 Melville Street, Glasgow.
 R.A.I.B.C.: Mrs. F. Woolley, G3LWY, 331 Wigan Lane, Wigan, Lancs.
 RAFARS: Sqn. Ldr. C. F. Selwood, RAFARS Hq., RAF Locking, Weston-super-Mare, Somerset.
 RHYL: H. Douglas, 7 Ffordd Ffynnon, Prestatyn, Flints.
 ROYAL NAVY: R/S. R. Malconson, HMS Mercury, Leydene, Petersfield, Hants.
 SALOP: W. Lindsay-Smith, G3WNI, 22 Kingswood Crescent, Copthorne, Shrewsbury.
 SILVERTHORN: D. Standley, G3XSA, 212 Westwood Road, Chingford, London, E.4.
 SOLIHULL: J. Lester, G3VXV, 173 Damson Lane, Solihull, Warwickshire. (021-705 3060.)
 SOUTH BIRMINGHAM: R. Brice, 60 Coraline Close, Chelmsley Wood, Birmingham, 37. (021-770 4265.)
 SOUTHGATE: A. F. Hydes, G3XSX, 6 Glenbrook North, Enfield, Middx.
 STOCKPORT: D. I. Lunn, G3LSL, 4 Farnham Avenue, Macclesfield (7903), Cheshire SK11-8LT.
 SURREY: R. Morrison, G3KGA, 33 Sefton Road, Croydon CRO-7HS, Surrey. (01-654 5982.)
 TAUNTON: G. Sweetman, Little Copse, Monkton Heathfield, Taunton, Somerset.
 UNIVERSITY COLLEGE OF WALES: D. West, GWTYI, Students Union, University College of Wales, Swansea.
 VERULAM: W. C. Dennis, G3NCK, 129 Colney Heath Lane, St. Albans, Herts.
 WORCESTER: R. L. Avery, G3TQD, 24 Alexander Avenue, Droitwich (3943), Worcs.



The Chesham Amateur Radio Society chaps are keen on competitive working—their station G3MDG took part in MCC, and also in the two-metre contest during the first weekend of March. They have a good selection of gear and a keen membership—which, we are told, is constantly increasing—and their twice-weekly R.A.E. lectures are being well attended. This photograph was actually taken during their participation in the Scout event last October.

Picture courtesy "The Bucks Advertiser"

at the Penguin Lounge, 37 Brighton Road, Surbiton.

Weekly on Fridays is the form at Taunton, where the meeting-place is at S.E.V.O. Hq., The Mount, Taunton. However, a change of venue is in the wind, and so a call to the hon. sec. seems to be indicated to get the latest information—see Panel opposite.

After quite a long break it is nice once again to hear from the Radio Club of Scotland by way of their *GM Magazine*. They assemble each Friday at 335 North Woodside Road, Glasgow, N.W. where something of interest is promised by the committee at every meeting—and if the recent past reviewed in their magazine is anything to go by they are not boasting.

Maidstone next, where Easter weekend is to be used for an all-out blitz on the odd items that so upset the NFD applicart last year. April 11 is down for the AGM; Hq. of course is the YMCA Sports Centre, Melrose Close, Loose, where they have extensive facilities available to them.

Guildford are working in very closely with Surrey University group, and indeed the meetings alternate at the two Hq. Thus, April 11 is the Guildford AGM, at the Model Engineering Group, Stoke Park, Guildford. On April 29 they go to Surrey University for a discussion on VHF portable operation.

A real Yorkshire welcome is promised by the Pudsey lads to anyone who may go to one of their evenings of makes an enquiry, either by phone or letter; Bramley Liberal Club is the spot; any Wednesday evening, and

if equipped for /M on Top Band or Two, the call to look for is G3XEP.

Last month the Blackpool and Fylde chaps had their AGM and were able to record a very successful year in several ways. They have space at Pontins Holiday Camp Club Room, every Monday evening.

New premises! At last the search is over for the Hereford crowd, after a prolonged battle, and in what seems to have been a rather unexpected way. The new place is in the old Civil Defence Hq., Gaol Street, beneath the police-station. Parking in the space between Gaol Street and Bath Street. April 11 is down for a talk on Fault-finding and Alignment of the AR88D receiver, and on 18th they have a lecture by Wing Cdr. Wilson of the Civil Defence people on Emergency Communications.

It is a tradition with the Silverthorn chaps to have an annual camp over the Summer Bank Holiday weekend, with GB3SRC in operation. More normal operations are

TO GET INTO THE NEWS

Club Scribes and Secretaries should note these dates: April 4, for the May issue; May 9 for June; and June 6, for the July issue. Pse note also that reports must include the name/QTH of the Club secretary, for inclusion in the address panel. Address for "Month with The Clubs" is simply: Club Secretary, Short Wave Magazine, Buckingham.

carried on from Friday Hill House, Simmons Lane, Chingford, London, E.4 and details are available from G3XSA, as in Panel.

Victory Hall, Cox Green, Maidenhead, is the place to look for the Maidenhead crowd, on April 7 and 15. The former will witness a demonstration of the Heath SB-101 transceiver by G3VCT, while the latter is the usual informal evening. A list of summer outings is being organised, details of which can be obtained from the hon. secretary, G3FVC—who, incidentally, has held his post since the group was first formed.

Someone has taken care over the arrangements at South Birmingham, where last month they had a lecture by G3LNN on SSB, and this month, on April 2, the firm of Amateur Electronics, will be along to demonstrate the Trio equipment to the lads. Venue, as always, is the Scouts' Hut, Pershore Road, Selly Park, Birmingham 29. In addition, a party will be going to the Midlands Mobile Rally at Drayton Manor Park on April 20.

What is effectively a "nil" report comes in from the University of Liverpool hon. Secretary, for the very good reason that they are on vacation till near the end of April, and then will have noses firmly to the grindstone until mid-June sees the exams, out of the way. However, there will be a residual bit of activity doubtless, and so anyone who wants to know what they are up to can get in touch with the man in the Panel.

A new hon. secretary reports in from Farnborough, to say that Hq. is still at the Railway Enthusiasts' Club, near Farnborough Railway station, on the second and last Tuesday of each month. G3SSJ talks about the History of Amateur Radio on the first evening in April; and in addition it is hoped to have the Club 144 mc transmitter prototype finished, when a "production run" of nearly 25(!) will be started by members.

Because Fareham normally get together on Sunday evenings, the first week in April—Easter weekend—is scrubbed. However, on the 13th there is a quarterly general meeting; a talk on VHF construction on the 20th; and an all-day dummy run for Field Day on the 27th, weather permitting. This idea of a quarterly general meeting seems to be a good one—the object is to review progress at regular intervals and see where improvements can be made. All normal meetings are held at Portchester Community Centre, near Fareham, on the Sunday evenings.

* * *

Next meeting for Mid-Herts. will be on Thursday, April 10, eight o'clock at the Welwyn Civic Centre, when G3GGK will be discussing how to set about Equipment Reviews. The Club participated, quite successfully, signing their own G3WGC/A, in the recent Open Contest on Two Metres, in which they made 155 contacts, including EU's and GDX.

At Rhyd, their last meeting had an illuminating talk by GW3UMB—who is a professional instructor in Morse and Procedure. We have no information regarding forward plans.

According to the Northern Heights report and touching on the preamble to this piece last time out, *their* problem is not lack of volunteers for the selection of a committee but putting on the list those keen members who are *waiting* their turn to serve—good show! As

one might suppose, the Northern Heights meetings are well attended, the venue being the Sportsman Inn, Ogdon, Halifax, where they have the AGM on Wednesday, April 9. On the 23rd there is to be a lecture-demonstration on Colour Anodising Aluminium, by G3IKS, and on May 7 a visit to Manchester Airport.

Programme for Mid-Sussex is fortnightly on Thursdays—at Marle Place Further Education Centre, Leylands Road, Burgess Hill—where on April 10, G3WPO will Look at 160 Metres; on April 24, there is to be a "sale of surplus equipment" (the good old jumble-sale, which every Club must have from time to time!). They are also running a Constructional Competition (converted ex-Govt. gear *not* eligible), which is to be judged on May 22. The Club shack is being fitted out for the Tx and workshop, and it is intended eventually to run a 150-watt CW transmitter—on which we congratulate them (though the reason given is "in deference to TVI"!).

Deadline

This must be first post on Friday, April 4, please, addressed simply "Club Secretary," SHORT WAVE MAGAZINE, BUCKINGHAM. For the June "Month with The Clubs" we need your reports and comments by May 9, *latest*. Keep the Club wheels turning, keep warm—and keep your hon. treasurer happy if your sub. is due. No Club can be in a viable condition unless there is a surplus in the kitty—even if it's only 2s. 9d. Some Clubs have £100's of reserve funds (which can be embarrassing, because it is so difficult to get agreement on how the money ought to be used). If at your AGM, the treasurer can show a modest carry-forward, then your group is a going concern.



"... And while you're at it, you can do the living room ..."



THE OTHER MAN'S STATION

G3WOB

THE town of Ilkley in Yorkshire has only two licensed radio amateurs, *i.e.* G3WOB and G3WVD, both highly active on the bands. The station developed by William McAllan, G3WOB, at 20, Oakburn Road, Ilkley, has been designed to give all-band operation on both AM and SSB, including AM coverage of 2 and 4 metres. Apart from endless incursions into the design around transistorised circuits to meet the requirements of his research work at Bradford University Schools of Chemical and Control Engineering (involving items like miniature transmitters for telemetry of chemical plant control data on plant variables to process control computers), G3WOB operates the following commercial amateur-band equipment:

KW-2000A plus KW-1000 Linear Amplifier, K.W. Vanguard, Minimitter and Codar A.T.5 Transmitters for AM working; also T.W. Communicators for 2 and 4 metres AM operation, with other home-built valved and transistorised apparatus. Receivers in use include an AR88, Eddystone EA-12, and various transistorised home-built units for monitoring and similar purposes.

Mobile equipment in a Zephyr 6 Automatic was successful in winning at both the South Shields and Bridlington Rallies last year.

Aerials available include a Mosley TA33; dipoles for 40 and 80 metres, a 400ft. long wire for 160 metres, also

Yagi and 8-over-8 beams for VHF.

G3WOB conducts QSO's in English, French, German and Italian and is a regular member of the German Wetterrunde each morning at 6.30 a.m., when 40 stations all over Europe, each equipped with weather-reporting instruments, issue reports daily. The station up to now has accounted for 250 countries, mainly on SSB, and over 2000 German AT-stations have been worked.

G3WOB in his capacity of overseas training tutor, Bradford University, has to visit all countries in Europe every few months to supervise 100 students in training abroad. This gives him many opportunities of meeting foreign amateurs.

ALWAYS IN THE MARKET

We are, for material for paid publication in *SHORT WAVE MAGAZINE*—such as photographs of radio amateur interest, short descriptive articles, constructional material covering apparatus for practical operation on the amateur bands, and accounts of experiences with gear built from *Magazine* articles. We pay good rates, immediately on publication, for anything we can use in these categories. Send your picture, article or story to: Editor, *SHORT WAVE MAGAZINE*, BUCKINGHAM.

NEW QTH's

This space is available for the publication of the addresses of all holders of new U.K. call signs, as issued, or changes of address of transmitters already licensed. All addresses published here are reprinted in the U.K. section of the "RADIO AMATEUR CALL BOOK" in preparation. QTH's are inserted as they are received, up to the limit of the space allowance each month. Please write clearly and address on a separate slip to QTH Section.

- EI4BX**, J. M. Bellew, 11 Long Avenue, Dundalk, Co. Louth.
G2BIM, L. W. J. Leask, 40 Woolbrook Park, Sidmouth, Devon. (*re-issue.*)
G2FNK, J. H. Ellis, 15 Georgian Close, Leacroft, Staines, Middlesex. (*re-issue.*)
G3XQL, J. Barker, 15 Hookstone Road, Harrogate, Yorkshire.
G3XTN, R. Hough, 225 Brown's Lane, Allesley, Coventry, Warks. (*Tel. Allesley 2427.*)
G3XVB, A. F. Vizoso, East Gate, Old Castle Road, Salisbury, Wilts. (*Tel. Salisbury 27170.*)
G3XWZ, F. J. Clarke, 149 Somersall Street, Mansfield, Notts.
G3XZP, D. M. Holburn, Llanrwst, Lydgate Lane, Wolsingham, via Bishop Auckland, Co. Durham. (*Tel. Wolsingham 364.*)
G3YBC, J. R. W. Harris, 24 Cope Hill, Purley, Surrey. CR2 4LH.
GW3YBN, C. Davies, B.Sc., 19 Packers Road, Porth, Rhondda, Glam.
G3YBY, I. D. McCarthy, 1 Greenway, Bruche, Warrington, Lancs.
GM3YCB, S. Riddell, 79 Brown Avenue, Clydebank, Dunbartonshire.
G3YCO, R. J. Lewis, 22 Beechcroft Drive, Whitby, Ellesmere Port, Cheshire. (*Tel. 051-355 2122.*)
G3YCT, P. A. Scragg, 38 Norwood Gardens, Southwell, Notts.
G3YDC, M. E. Brett, 158 Streamleaze, Thornbury, Bristol.
G3YDJ, L. F. Masters, O.B.E., 16 Burghley Avenue, New Malden, Surrey. (*Tel. 01-942 5533.*)
G3YDU, J. H. Peters (*ex-G8BNM*), 43 Holtwood Road, Glenholt, Plymouth, Devon. (*Tel. Plymouth 77878.*)
G3YDZ, P. Radford, 28 Loxley Road, Oulton Broad, Lowestoft, Suffolk. (*Tel. Lowestoft 5922.*)
G3YEL, M. C. Holtby, 1 Leybourne Road, Hillingdon, Middlesex. (*Tel. Uxbridge 38817.*)
G3YEM, S. H. Webster, St. Mary's Vicarage, Bristol Road, Selly Oak, Birmingham 29. (*Tel. 021-472 0250.*)
G3YET, W. M. Arnold, 25 Park Drive, Heaton, Bradford 9, Yorkshire.
G3YFH, E. Bedford, 4 Castlegate, Newark-on-Trent, Notts.
G8BRU, G. Gallamore, 34 Langdale Road, Partington, Urmston, Manchester. M31 4NE. (*Tel. 061-775 4738.*)
G8CEF, D. Walsh, Sedan, Stock Lane, Ingatestone, Essex. (*Tel. Ingatestone 667.*)
G8CHF, H. Hughes, Brackley House, Warrington Road, Goose Green, Wigan, Lancs.
G8CHT, D. Heaton, 1 Jer Lane, Gt. Horton, Bradford 7, Yorkshire. (*Tel. Bradford 71128.*)
G8CIA, G. Austin, 38 Willow Crescent, Hatfield Peverel, Chelmsford, Essex.
G8CIS, C. J. Adams (Electrical Dept.), Harringay Stadium, Green Lanes, London, N.4.
G8CJB, J. A. Bradley, 106 Castlecroft Road, Finchfield, Wolverhampton, Staffs. (*Tel. Wolverhampton 61614.*)
G8CJQ, R. Barnes, 5 Prospect Drive, Hale Barns, Cheshire.
G8CJU, B. A. Pickers, B.Sc., 8 Croftway, Markfield, Leics.
G8CJX, P. Gill, 43 Oriel Drive, Aintree, Liverpool. L10 3JL.
G8CJY, B. Morton, 266 Bedford Road, Liverpool. L20 5BB.
G8CLF, A. C. V. Humphreys, 24 Van Dyck Avenue, New Malden, Surrey. (*Tel. 01-337 1662.*)
G8CLH, C. S. Manklow, 51-A Ashburnham Road, Hastings, Sussex.
- CHANGE OF ADDRESS**
- GM3AWF**, D. F. Craig, 13 Clifford Road, North Berwick, East Lothian.
G3BJQ, W. H. Tanser, 21 Hookwater Road, Chandlers Ford, Eastleigh, Hants.
G3FJE, Shefford and District Amateur Radio Society, Church Hall, High Street, Shefford, Beds.
GW3GKZ, M. D. Fowler, Ty Gwyn, Abergwynant, Islaw'r Dref, Dolgellau, Merionethshire.
GM3HJB, A. S. Culley (*ex-VE3GLC*), 126 Castle Hill Road, Aye, Ayrshire.
G3HYJ, O. F. Simkin, 6 Riseway Close, Valley Drive Estate, Norwich, Norfolk. NOR. 86-P.
G3INU, R. J. Appleby, 27 Harrow Court, Silam Road, Stevenage, Herts.
G3LHA, R. L. Bastin, 40 Stamford Avenue, Coventry, Warks. CV3 5BX. (*Tel. Coventry 67133.*)
G3RBU, Amateur Radio Society, Students' Union, University of Bradford, Bradford 7, Yorkshire.
G3RJS/MM, P. F. Barry, 3/R/O, s.s. Oronsay, c/o P. & O. Beaufort House., 2 Gravel Lane, London, E.1.
G3RYZ, M. G. Byrne, 16 Downham Gardens, Tamerton Foliot, Plymouth, Devon.
G3SIH, R. F. C. Bennett, 206 Corsham Road, Whitley, Melksham, Wiltshire.
G3SMB, W. Reilly, 213 Long Lee Lane, Long Lee, Keighley, Yorkshire. (*Tel. Keighley 5480.*)
G3THA, D. W. H. Ashton, 44 Woodlands Road, Formby, Liverpool. L37 2JW.
G3UEN, R. W. Stiles, Outgate, South Sea Road, Flamborough, Bridlington, Yorkshire E.R.
G3UFZ, C. H. Foulkes, 21 Pishobury Drive, Sawbridgeworth, Herts.
G3UPZ, H. W. James (*ex-GM3UPZ/9V10A*), 21 St. Simons Drive, Cherry Willingham, Lincoln.
G3WSJ, A. Evans, 134 Kingshill Road, Swindon, Wilts.
G3WYW, P. C. J. Bigwood, 10 The Garth, Kenton, Newcastle-upon-Tyne 3. (*Tel. Gosforth 53879.*)
G5LY, K. C. Lay, 53 Riders Bolt, Hurchington, Bexhill-on-Sea, Sussex.
G6AAL/T, A. T. Jenkins, 15 Tilstone Avenue, Eton Wick, Windsor, Berks.
G8ABL, G. R. Smith, Flat 7, The Grange, Otley Road, Leeds. LS16 6EY. (*Tel. Leeds 676016.*)
- AMENDMENT**
- G3YBH**, P. Storey, 29 Chalfont Road, Liverpool, 18.

GOVT. SURPLUS WIRELESS EQUIPMENT HANDBOOK

This useful handbook gives detailed information and circuit diagrams for British and American Government Surplus receivers, transmitters and test equipment, etc.; also contained are some suggested modification details and improvements for the equipment. Incorporated in this revised edition is a surplus/commercial cross referenced valve and transistor guide. This book is invaluable to radio enthusiasts, radio clubs, universities and laboratories. The latest edition priced at 35/- per volume, plus 5/- P. & P. Only obtainable from us at: Dept. SW.

GILTEXT (LEEDS) LTD

24, STANFIELD CHAMBERS
Great George Street, Leeds 1

The Amateur Radio Shop, G4MH

13 CHAPEL HILL, HUDDERSFIELD. Telephone 54650

New — 9R59DE, JR500SE, ATS and PSU, T28, etc.
New — The 4MH 2m. Converter, AF239, AFZ12. Size: 4" x 3" x 1 1/2". Only 10 gns.
New — The 4MH range of Dipoles, 16 swg Hard Drawn Copper, 60ft. low loss Coax, 160, £5 5s.; 80, £4 10s.; 40, £3 10s. 20, £2 15s.; 21, £2, 10, £1 15s.
Second-hand —
AR88D £45 AR88LF £35 HRO £20 640 £20
358X £12 T28 £10 AT5 £10 TCS12 £8
Scarce Items —
6, 7, 8 Mc/s. Xtals (8100 FT243 10/-)
Morganite Dummy Loads, 50(), 7/6
0-1A RF Meters. New, boxed, 15/-
14ft. Whips, 12/6
Few only Tested, 4CX250B, 40/-
Also — Tavasu Mobile Whips, 2, 4 and 70 cm beams.
S.A.E. for full lists. All items post paid.

YUKAN SELF-SPRAY SO PROFESSIONAL THE YUKAN AEROSOL WAY—
Get these air drying GREY HAMMER NOW! OR (CRACKLE) finishes

Yukan Aerosol spraykit contains 16 ozs. fine quality, durable easy instant spray. No stove baking required. Hammers available in grey, blue, gold, bronze. Modern Eggshell Black Wrinkle (Crackle) all at 15/11 at our counter or 16/11 carriage paid, per push-button self-spray can. Also Durable, heat and water resistant Black Matt finish (12 ozs. self-spray cans only) 13/11 carriage paid.
SPECIAL OFFER: 1 can plus optional transferable snap-on trigger handle (value 5/-) for 18/11, carriage paid. Choice of 13 self-spray plain colours and primer (Motor car quality) also available.
Please enclose cheque or crossed P.O. for total amount direct to:
DEPT: P/2 YUKAN, 307a, EDGWARE ROAD, LONDON, W.2.
We supply many Government Departments, Municipal Authorities, Institutes and Leading Industrial Organisations—We can supply you too.
Open all day Saturday. Closed Thursday afternoons.

Other Yukan Air Drying Aerosols, 16 ozs. at 16/11 cart. good include:
Zinc Chromate Clear Lacquer
Metallics: Grey, Blue, Bronze and Gold.



INTERESTED IN COUNTING?

- 2 BECKMAN E.P.U.T. ELECTRONIC COUNTERS Each £50
 - 1 CINTEL MISSED PULSE ELECTRONIC COUNTER—S.V.T.L. (Anti co-incidence counter) ... £20
 - 1 CINTEL AUDIO RC OSCILLATOR AND AUTOMATIC FREQUENCY MONITOR COUNTER, Type 1945 ... £30
 - 2 CINTEL MICROSECOND CHRONOMETER COUNTERS ... Each £15
 - 5 GEIGER COUNTER SCALER UNITS (untested) ... Each £5
 - 1 GEIGER COUNTER P.S.U. and RATEMETER (untested) £5
 - 2 MARCONI ELECTRONIC COUNTERS TF 922/1 £15 and £6
 - 2 AIRMEC COUNTERS, Type 865 ... £10 and £6
 - 2 8 Mc/s. COUNTER CHRONOMETERS (require attention) Each £5
- Carriage extra on all items

ELEY ELECTRONICS
112 Groby Road, Glenfield, Leicester, LE3-8GL.

G3XKF G3XKF

Minitenna Beam Products

The MINI-TEN two element beam still at £8 19s. 6d. plus 10/- post and packing.
TIGER 200 TX. 80 to 10 metres. Excellent condition. 150 watts all bands, £35.
HAMMARLUND HXL1 LINEAR as new in original carton with manual, £95.
WANTED. Hammarlund HQ170 Rx.
Receivers bought for cash, state price and condition.
(J. Sharratt)
EDLESBOROUGH, DUNSTABLE, BEDS.
Tel. Eaton Bray 297

CRYSTAL CALIBRATOR CC-10



Designed to meet amateur licence requirements the CC-10 generates marker pipes of 1MHz-500-100-50-10-5KHz spacing up to 600MHz. Stabilised precision 1MHz oscillator ± 10 ppm. Internal mixer and AF amplifier enables use as heterodyne wavemeter and Mod monitor. Battery operated solid state P.C. construction for reliability. Price £22/10/- plus 9/- P. and P. Delivery 6-8 weeks due to popular demand. CWO or SAE enquiries to:—
BURNS ELECTRONICS
THE COTTAGE, 35 BEULAH HILL, LONDON, S.E.19

REDUCED TO CLEAR

Only a limited number of copies available, please order early.

RADIO AMATEUR HANDBOOK, ARRL 45th Edition 1968	Half-price	25/-
WORLD RADIO AND TV HANDBOOK 1968 edition	Half-price	21/-
RADIO AMATEUR CALL BOOK (Autumn 1968 edition) U.S. only		32/6
RADIO AMATEUR CALL BOOK Winter edition		DX 30/- U.S. 45/-

All the above prices include postage and packing.
Publications Dept.
SHORT WAVE MAGAZINE
55 Victoria Street, London, S.W.1.
(GIRO A/C. No. 547 6151)

WESTERN ELECTRONICS

"Towers above all else"
NEW! We specialise in the supply of towers, masts and associated equipment offering a LARGE range at LOW prices.
TELESCOPIC ROTARY MASTS. These telescope down to 10' Available in 20', 30', 40' and 50' sizes from £12 complete.
TELESCOPIC TOWERS. Galvanised steel in 42', 57', 79' and 101' sizes from £65 complete.
NEW! **CUBEX TENNA-SWITCH.** These are on the way over from the U.S.A. for switching co-ax or twin feeder to 4 antennas 110v. A.C. Compact control unit operates remote switch mounted on boom or mast, £12.
Improve your antenna system as follows: from your Tx to a HY-GAIN BALUN by co-ax and then to the TENNA-SWITCH by twin feeder and out to the antenna by twin cable. You save 3 baluns and 3 lengths of co-ax which pays for the TENNA-SWITCH and you gain a balanced feed! S.A.E. for list.
G3NMH at your service at
24 HOOK STREET, HOOK, SWINDON, WILTS.
Telephone: Wootton Bassett 2792

THE NEW SWAN 260

will shortly be available from stock. This new 260w. PEP 80-10 metre amateur bands Transceiver is complete in one package with self-contained AC supply and 12v. DC supply and microphone, at an inclusive price of £199.

Technical details will be supplied on request.

PETER SEYMOUR LTD.

410 BEVERLEY ROAD, HULL, YORKSHIRE

Telephone: Hull 41938

"CALLBOOK"

SPRING EDITION

Limited Quantity Only

Known the world over as the CALLBOOK, this comprehensive reference lists about 300,000 licensed radio amateurs in the United States Directory and 145,000 or more in the rest of the world (contained in the "DX Section"). The listings grow with every issue! In the U.S. Section, licence classifications are shown. Each issue is an entirely new book with revised listings of new licences, names and addresses. The CALLBOOK also includes much incidental DX information. Every amateur operator and SWL needs the latest CALLBOOK to get the most out of Amateur Radio.

DX Listings 43/- US Listings 64/6

The two together, covering the World, £52/6
Post free

Available only from

Publications Dept.,

SHORT WAVE MAGAZINE

55 Victoria Street, London, S.W.1
01-222 5341

SMALL ADVERTISEMENTS

("SITUATIONS" AND "TRADE")

9d. per word, minimum charge 12/-. No series discount. All charges payable with order. Insertions of radio interest only accepted. Add 25% for Bold Face (Heavy Type). No responsibility accepted for errors. Replies to Box Numbers should be addressed to The Short Wave Magazine, 55 Victoria Street, London, S.W.1.

SITUATIONS

SEEKING a Licensed Amateur, experienced HF-VHF-Transistory, with good test gear and pride in everything he builds, for occasional homework on the construction and testing of prototypes and kits.—Box No. 4760, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SENIOR Service Technician: An experienced electronic engineer required to service and repair a wide range of electro-acoustic products. Minimum qualification ONC/City & Guilds. Driving experience essential. Starting salary for right man, £30 per week. — Apply Amplivox Ltd., Beresford Avenue, Wembley, Middlesex.

TRADE

QSL Cards for Tx and SWL. Send s.a.e. for samples, stating which type required. Prices from 12s. 6d. per 100, purchase tax and post paid.—Beaumont, G5YV, 8 Ashfield Avenue, Morley, Leeds.

QSL Sample, excellent range at right price, also Log Books at 7s.—Bailey & Co., Greenfield Place, Weston-super-Mare, Somerset.

UFO Detector Circuits, with data, price 10s., refundable.—Paraphysical Laboratory (UFO Observatory), Downton, Wiltshire.

QSL Cards: Two-colour, attractive design, variable features from £3 3s. per 1,000 (inclusive). Send foolscap s.a.e. for samples.—ARA Press, 46 Moat Avenue, Green Lane, Coventry.

QSL Cards and Log Books, GPO approved, cheapest and best. Prompt delivery.—Samples from Atkinson Bros., Printers, Looe, Cornwall.

LEICESTER G3ACQ: For Trio TS500, JR500, 9R-59DE; Eddystone EC-10; Codar; Joysticks; Nombrex; G.E.C. 0.1 mA 2in. panel meters, 20s.; factory reconditioned Avometers; Surplus Transistor Panels.—May's, Churchgate, City Centre, Leicester.

MINI-MOBILE: Send s.a.e. for component catalogue. Resistors, quarter-watt 10% film, 13s. per 100.—SRV Electronics, 11 Rosedene Avenue, Croydon, Surrey, CRO-3DN. (Tel. 01684 0402.)

MAY Issue: Appears April 25. Single-copy orders, 4s. (or 4s. 3d. "first-class" mail) to reach us by Wednesday 23rd, for posting on the 24th.—Circulation Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

YOUR Unwanted Equipment taken in exchange for new or second-hand cameras, projectors, etc.—York Photo Service, 51 Fossgate, York (56176).

TWO-METRE Transistorised Converters: AF239 low-noise front-end and mixer; crystal controlled oscillator chain, HC-6U type crystal; built into 4in. x 3in. x 1½in. aluminium case; available with IF tuning ranges 20-22, 24-26 or 28-30 mc. Price £9 10s. each, plus 3s. post/packing. Also 70-Centimetre Converters built to order at £14 each. AF239, 10s. each. Crystals to your frequency, price on application.—Grigg, G3PRX, 72 Elmstone Road, Rainham, Kent.

READERS ADVERTISEMENTS

3d. per word, minimum charge 5/-, payable with order. Add 25% for Bold Face (Heavy Type). Please write clearly, using full punctuation and recognised abbreviations. No responsibility accepted for transcription errors. Box Numbers 1/6 Extra. Replies to Box Numbers should be addressed to The Short Wave Magazine, 55 Victoria Street, London, S.W.1.

SALE: Codar CR-70A receiver and headphones, three months old; Joystick VFA aerial, de luxe version, with Type 4 tuner; also current World and U.K. "Call Books." All in at £19 10s.—Gilbertson, Brightleigh, Millers Lane, Outwood, Surrey.

WANTED: Codar PR-30X preselector. Price and details.—Jepson, 3 Lawrie Lane, Lindfield, Sussex.

FOR SALE: Heathkit DX-100U, little used, £55.

WANTED: Faulty CR-100, also Terminal Unit suitable for Creed 7B teleprinter.—Tibbert, 397 Uttoxeter Road, Derby.

WANTED: Cossor Type 339 Oscilloscope in mint condition. State price and details, pse.—Fraser, 278 Stonelaw Road, Rutherglen, Glasgow, Scotland.

WANTED: Two-metre Converter, having IF between 1.8 and 11 mc; also a 6- or 8-ele two-metre beam. Details and price.—Duvoisin, G8CBM, 16 Holt Drive, Wickham Bishops, Witham, Essex.

WANTED: The manual for a BC-221T. Your price paid, all letters answered and postage refunded.—Shepherd, 72 Westerland Avenue, Canvey Island, Essex.

SALE: Type C.53 Signal Generator, 230v. AC, with charts, price £15. National HRO receiver, with eight coil packs, HRO PSU, spare valves and manual, £10. Juliette NA.5018 five-band receiver, as new in carton, sell £20 or Exchange for B.40 Rx.—Archard, Southways, Seaton (479), Devon.

WANTED: Communication receiver, such as BC-348Q, SX-38A, Bendix RA-1B or anything similar, for AC mains, with bandspread and coverage 10 to 160m., must be good DX'er, medium size and cheap. Have for Sale or Exchange HA-700, at £30. (Midlands).—Box No. 4762, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Three-inch astronomical refracting telescope, with Equatorial mount, 3-h.m. eyepieces and Barlow lens, erecting prism and Sun projection screen, price £60. **WANTED:** Codar T.28 receiver.—Bicknell, 948 Kingstanding Road, Birmingham 22C. (Tel. 021-353 4248.)

SELLING: Eddystone 840C, as new and still under guarantee, price £40. (Midlands).—Box No. 4763, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: Nordmende Globetraveller III Transistor Portable Receiver. Fifteen-band for LW/MW/FM and 11 short-wave ranges, battery/mains operation, as new, price £55.—Brady, Box 1438, R.A.F. Lakenheath, Brandon, Suffolk.

SALE: Ribbed heavy-duty aerial insulators, 7in. long, new, at 5s. each, post free; six or more for 4s. each.—Webster, Citadel 138, Parklands, Little Sutton, Cheshire, L66-3QD.

WANTED: Vanguard or similar 50-150w. Tx, or a Transceiver. Must be in FB condition.—Wilkinson, 35 Street Lane, Leeds, 8. (Tel. 664823.)

FOR SALE: K.W. Viceroy Mk. IV SSB/CW Tx, as new, one owner, with extra lattice-filter and aerial relay, little used, cost £168, the first £105 secures. Also an Eddystone EA-12 Rx, in immaculate condition, £115.—Roberts, G3AQX, Wessington Cottage Farm, Slack Lane, Wessington, Derbyshire, DE5-6BY. (Tel. Alfreton 2943.)

SALE: Lafayette KT-320, price £10 (carriage 20s.). Canadian 52 Set. with mains PSU, £8 (carriage 20s.). Codar CR-45 receiver, £4 (carriage 10s.). Avometer Mk. VII. £6 (carriage 10s.). All radios complete with handbooks, etc.—Ashworth, 239 Bury Road, Rawtenstall, Rossendale (3187), Lancs.

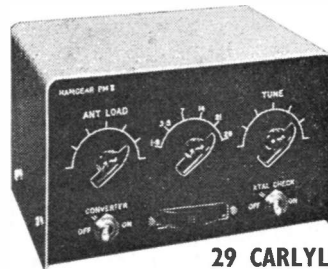
RTTY — It's easy with PRINTSET!

● DL6EQ Demodulator (TU). ● Mark/Space filters (2125/2975 or 1050/1900 Hz). ● Bandpass filters (2-3 or 1-2 kHz). ● Mark/Space tuning indicator. ● F. S. Keyers (xtal or VFO) ● A. F. S. Keyers (SSB or VHF-AM). ● 425 Hz Forks (Fork standards). ● 125 Hz Strobe Forks (Motor speed checking) ● 88 mhy Toroids.

CW — Send perfect Morse with the SAMSON ETM-2 Electronic Keyer. — Silent reed relay. ● Compact. ● Uses 4 x 1.5v. batteries. £21, post paid. 154-page Catalogue SP5 describes these and other VHF, SSB, CW and RTTY kits and units.

SPACEMARK Ltd. 14 PICCADILLY, MANCHESTER 1 (Tel: 061-237 0817)

HAMGEAR ELECTRONICS



We supply a series of preselectors with antenna tuners priced from £5.18.0 to £17.18.0 if you want to make the most of your antenna and hot up your receiver at the same time send for details of these units.

29 CARLYLE RD., NORWICH

BEQ AMATEUR SUPPLIES

120, Mossley Road, Ashton-U-Lyne, Lancashire

Mail order only. All components brand new.

Field effect transistors. Post free. MPF 105, 8/3; MPF 102 VHF, 8/6; MPF 106 UHF, only, 13/-. 2N3055. 115 watt audio power transistor, £1.

VISIT US AT THE BELLE VUE CONVENTION—APRIL 27th

SAE for latest lists.

CATALOGUE

The most COMPREHENSIVE—CONCISE—CLEAR—COMPONENTS CATALOGUE. Complete with 10/- worth discount vouchers FREE WITH EVERY COPY.

- ★ 35 pages of transistors and semi-conductor devices, valves crystals.
- ★ 220 pages of components and equipment.
- ★ 65 pages of microphones, decks and Hi-fi equipment.

SEND TODAY 8/6 post paid

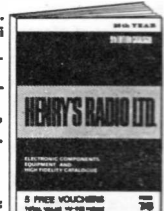
HENRY'S RADIO LTD.

303-309 EDGWARE RD., LONDON W.2.

For all types of Components phone: 01-723 1008/9

High Fidelity Sales and Equipment phone: 01-723 6963

Completely new 9th 1969 edition
320 BIG pages
6,500 items
1,200 illustrations



SWANCO PRODUCTS

LIMITED
G3NAP AMATEUR RADIO SPECIALISTS G3PQQ
NEW EQUIPMENT

	£	s.	d.
Sommerkamp F-Series Equipment :			
FR-DX 500 double conversion superhet, 160-10 metres	130	0	0
FL-DX 500 SSB/AM/CVW transmitter, 240 watts PEP	145	0	0
FL-DX 2000 linear amp, 1200 watts PEP	100	0	0
Sommerkamp FT-DX 150 transceiver 80-10 metres	215	0	0
Sommerkamp FT-DX 500 transceiver, 80-10 metres	250	0	0

Swan Line :			
Swan 350C transceiver, 80-10 metres	216	0	0
Swan 500C transceiver, 80-10 metres	263	0	0
Swan 230-XC power supply a.c.	65	0	0

Eddystone Radio Ltd.:			
Eddystone EA12 Amateur band receiver, 160-10 metres	193	0	0
Eddystone 940 communications receiver	143	0	0
Eddystone 840C short wave receiver	70	0	0
Eddystone EC10 transistorised communications receiver	59	10	0
Eddystone EB35 short wave and F.M. receiver	64	13	4
Eddystone EB36 short wave broadcast receiver	56	5	0

Trio Communications Equipment :			
Trio TS-500 SSB transceiver with a.c. p.s.u. and with split frequency V.F.O.	231	0	0
Trio 9R99DE communications receiver	39	15	0
Trio JR505E amateur band receiver, 80-10 metres	69	10	0

Lafayette Receivers :			
Lafayette HA500 amateur band receiver, 80-6 metres	44	2	0
Lafayette HA600 solid state receiver	45	0	0
Lafayette HA350 amateur band receiver	67	10	0

Mallicrafters Equipment :			
SX-130 communications receiver	86	15	0
SX-122 communications receiver	148	5	0
SX-146 amateur band receiver	137	5	0
HT-46 SSB transmitter (works in transceiver with SX-146 receiver)	192	5	0

Mosley Electronics (Beams) :			
TA-33 Jr. Tri-band three element beam	27	5	0
TA-32 Jr. Tri-band two element beam	19	5	0
TA-31 Jr. Tri-band dipole	11	11	0
V-3 Jr. Wire trap dipole	6	15	0

Channelmaster Rotator :			
Automatic Tenn-A-Liner	19	19	0
Compass Tenn-A-Liner	14	14	0
Rotator alignment bearing	3	17	6
Ball bearing guy ring	2	7	6

Park Air Electronics :			
2 metre transmitter (complete with Mic., etc.)	80	0	0
Kurer aircraft, short, medium, and long wave receiver	42	15	3
Sky bandit aircraft receiver	23	10	0
Concorde aircraft receiver	17	15	0
Jet set aircraft receiver	13	14	6

G-Whip Antennas :
G-Whip mobile antenna range. Lightweight design. Helical wound. Superior performance. S.A.E. Illustrated brochure and Prices.

Swanco/CSE Equipment :			Partridge Electronics :				
	£	s. d.		£	s. d.		
2/A10 transmitter	43	7	0	Joystick standard	5	2	6
2-AR receiver	44	0	0	Joystick de-luxe	6	5	0
Type 2 A.T.M.A. aerial	9	15	0	Type 3 tuner	2	15	0
Type MM2 microphone	2	17	11	Type 3A tuner	3	19	0
				Type 4 tuner	5	5	0
				Type 4RF tuner	6	17	6

Codar Radio Company :			Shure Microphones :				
	£	s. d.		£	s. d.		
CR.70A receiver	19	10	0	Shure 201	5	12	6
PR.30 preselector	3	19	6	Shure 202	6	0	0
PR.30X (with p.s.u.)	7	19	6	Shure 444	12	15	0
R.G.10 Q multiplier	7	5	0	Shure 401A	6	15	0
R.G.10X (with p.s.u.)	8	17	6	Shure 275SK	5	5	0
CC40 control unit	6	15	0				
CR.45K receiver	9	15	0				
CR.45RB receiver	11	19	6				
AT5 transmitter	16	19	6				
250 volt p.s.u.	8	10	0				
I2/MS p.s.u.	11	10	0				
I2/RC control	2	10	0				
T.28 receiver	15	17	6				
Mini Clipper kit	2	4	6				

Full range of KW Equipment available to order.
Full range of Drake Equipment available to order.
Full range of Heathkit Equipment available to order.

SECOND-HAND EQUIPMENT

Many items in stock, including :- Eddystone 870A, 840C, EA12, AR88D, AR88LF, HRO, R209, SR550, 9R59, DX40U, VFO-1U, DX100U, LG300, LG50, Panda Cub, KW Vanguard, Lafayette Starflite, etc. Your enquiries please.

Full service facilities—receivers re-aligned, transmitters serviced, etc.

SWANCO PRODUCTS LIMITED

Dept. S, 247 Humber Avenue, COVENTRY
Hours : Telephone : Coventry 22714
Mon., Tues., Wed., Fri., Sat. 9 a.m.—5.30 p.m. Thurs. 9 a.m.—12 noon

SMALL ADVERTISEMENTS, READERS—continued

WANTED: Crystals for 450, 451.9 and 452.4 kc, also 5-150, 6-600 and 9-000 mc. Please write first.—While, G3UXP, QTHR.

FOR SALE: Works-built Lafayette KT-320, with Jackson two-speed dial drives on bandspread and BFO controls, bargain at £22. Codar 70A receiver, in first-class condition, £14. Codar T.28 Rx, with built-on speaker unit and battery for /P use, complete at £14. Also Codar PR-30X preselector, £5. Prices include post and packing.—Atkins, c/o Co-Op., West Street, Leominster, Herefordshire.

DISPOSAL: AR88LF with rack; Heathkit GD-U GDO for eight bands; Nombrex 27; Oscilloscope; Field Strength Meter; Pye Continental Rx; R.C.A. Record Player; Phonocorder; Electric Organ; FM Tuner with amplifier; Folding Caravan; Half-Inch Electric Drills, Rivetter and Sander. Pse send s.a.e. for details of these and other items. Prefer buyer to collect the heavy stuff. Note: Will give £30-worth of gear for a good Heathkit Mohican receiver. (North-East).—Box No. 4764, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SELLING: Valves 829B, 20s.; U19, TT15 and TZ-40, 10s.; QV04-7, 807 and GZ-37, 5s. Bases for 829B, National type JX-100S, 3s. 6d. Also twin-gang 100 mmF condensers, 5s. Postage 1s.—Cooper, Outwell, Wisbech, Cambs.

FOR SALE: Complete Bendix MN-26C Radio Compass installation, for 24v. operation, £25. Marconi TF-390F Signal Generator, coverage 18 to 150 mc, £10. Also receiver installation AN/ARR-2, tuning 234 to 258 mc, 12v. working, £8.—Cubitt, 53 Westbourne Park Road, London, W.2. (Tel. 01-229 8524.)

WANTED: Book giving R.A.E. questions and answers. Your price paid.—Martin, 14 Upper Mead, Bromley Cross, Bolton, Lancs.

SELLING: Marconi Industrial Television Camera, with Control Unit and Monitor, modified for 625-line and including various extras (ideal for A/TV transmission), price £35. Lektrokit standard 6ft. 19in. rack, on wheels for easy movement, £6. Tripler for 70-cm., commercial job but less its QQV03-20, £5. Complete transmitter for 70 centimetres and two metres, relay controlled and band-switched, with transistor modulator and Inverter/PSU for 12v. operation, £20. Two 6-volt 170 amp-hour accumulators, charged and filled, in as-new condition, the pair for £8. Garex two-metre QQV03-10 transmitter kit, 60s. Signal generator for 4 metres, with diode noise unit, £4. Diatonic linear 14-watt audio amplifier, £5. Transistor modulator, rated 10 watts, 12v. working, £4. R.220 receiver, tunable over 4 metres, £4. UHF Power Meter, measures RF power and VSWR, £6. Skybeam, 14-ele for 70 centimetres, by J-Beam, 60s. Buyers to inspect and collect or pay carriage.—Knights, G3TQY, Ashar, Cross Road, Tadworth (3247), Surrey.

HELP! Impecunious 15-year-old schoolboy with R.A.E. pass and £12 in kitty has no HF gear, Rx or Tx. Could anybody please assist?—Whitting, 1 West Dene, Wigton Lane, Leeds, 17, Yorkshire. (Tel. Leeds 688689.)

MANUALS For Sale: 'B.40, Collins types, 35s.; AR88LF, 21s. Scores of others; send s.a.e. for list.—Brooks, 5 Farrant House, Winstanley Road, London, S.W.11.

SELLING: Labgear LG.50 Tx, with new PA and modulator valves, £25. Home-built Tx for 160m., fitted coils for 80m., with two PSU's, £8. Mains transformer suitable AR88D, used, 30s. Transformer 546-0-546v. 230 mA, with 32v. and 5v. windings, 40s. (Prefer buyers collect these items.) Used AR88D parts: Drive mechanism and dials, 30s.; AF transformer, 10s.; tuning condensers, 20s.; wave-change switch, 20s.; AVC/NL switch, 10s. Also used TCS-12 Rx parts: Drive mechanism, dial and capacitors, 20s.; AF transformer, 10s.; IFT's and BFO, 5s. each; postage extra on these.—Wiseman, G3PKV, 18 Akrotiri Square, Watton, Thetford, Norfolk.

SMALL ADVERTISEMENTS, READERS—continued

FOR SALE: Triangular 60ft. lattice mast, suitable heaviest beams, £60. Re-engineered Minimitter rotator-indicator, £15. Labgear aerial-selector change over relay unit, £5. Viceroy cabinet, chassis and panel, £4. Triplett multimeter, £7. Crystal Calibrator, 40s. PSU, 12v. DC, 50s. Slow Morse record (G3HSC), 30s. Also have for disposal a wide range of meters, transformers and such; pse ask for list, with s.a.e.—Cheadle, G3NUG, 27 London Road, Shenley, St. Albans, Herts. (Tel. Radlett 4435.)

SALE: KW-2000A, four months old, with Shure microphone, price £180.—Tynan, 111 Cheam Common Road, Worcester Park, Surrey.

OFFERING: Akai M.9 Stereo Tape Recorder, used couple of hours only (listed £197 10s.), selling for £120 or near offer, or W-H-Y? I want parts for the G2DAF Tx/Rx, also Collins or Kokusai mechanical filters.—Morris, The Forge House, Church En-tonne, Oxford.

FOR SALE: Brand new, unmodified and unused, Collins TCS-12 Tx/Rx. with ATU mains PSU, microphone, key and all cabling, also handbook, price £60 or near offer.—Ring Taylor, 01-398 220 (London), after 6.30 p.m.

WANTED: Drake RV-3 or RV-4. Have for Disposal: New SB-600 speaker unit, £7; latest RSGB "Radio Communication Handbook" at 50s. only; R.C.A. AR77E with amateur bands spread, £15; also two-metre FET converter, IF 4.0 to 6.0 mc, with 15-watt 2m. phone Tx, self contained, together at £15. Pse include s.a.e. with enquiries.—Pedder, G3VBL, 107 Broad Oak Lane, Penwortham, Preston, Lancs.

WANTED: In good order and at a reasonable price, Lafavette HA-350 or HA-500. Suggest delivery arrangements with all details.—Cobb, 14 Dole Road, Swanley, Kent.

DISPOSING: Large quantity of Radio, Electronic, Hi-Fi, etc., equipment in marvellous condition. Too much to show in these pages. Send s.a.e for bargain list. (Surrey.)—Box No. 4765, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Hallicrafters S.36 receiver, covering 28-145 mc; T.W. Two transmitter, as new, with PSU; Mobile Tx/Rx, 12v., perfect: CR-150 Rx. 1.9 to 60 mc. like new; Collaro Tape Recorder, with built in linear amplifier, wooden case, perfect—these items all at £20 each. Also a Collins TCS transmitter, with PSU, £12 10s.—Wilson, 11 Marine Avenue, Skegness (2693), Lincs.

WANTED: Joystick, standard model, and Type 4 tuner. Also handbook for Hartley Oscilloscope Type 13A.—Jones, 230 Roman Road, London, E.6. (Tel.: 01-476 4050.)

SALE: PCR-2 communication receiver, with internal mains PSU, BFO, realigned and in good condition, £10 or offers.—Amery, G8AXN, 67 Foxley Lane, Purley, Surrey.

FOR SALE: K.W. Viceroy Mk. III CW/SSB transmitter, £85; also Heathkit DX-100U AM/CW Tx, £45. Both in excellent condition; prefer buyer inspects and collects. Also Electroniques Quoilpax Model HB-116T, £9. (Kent.)—Box No. 4766, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SELLING: R.A.E. Course, E.M.I., no transistory, 70s. Candler Beginner's Morse Course, 50s. Sangamo-Weston multimeter, Type E.772, 80s. Power Unit Type P.U.46, 50s. Xtal for 1537 kc, 5s. Also copies "Short Wave Magazine" May 1956 to March 1967, and RSGB "Bulletin" December 1958 to October 1967, 1s. 6d. each.—Harbour, 5 Lime Tree Avenue, Peterborough.

MAY Issue to appear April 25. Single-copy orders 4s. (or 4s. 3d. "1st class") should reach us by Wednesday 23rd, for despatch on Thursday 24th. These copies are sent flat in an envelope, and not folded.—Circulation Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

EDDYSTONE SHOWROOM



Visit the Eddystone Showroom at Imhofs and see all the popular models on permanent side by side demonstration. You can hear and compare the models that interest you and obtain the most expert advice about this range of superb communication receivers and accessories. Same day despatch to any part of the world, tax free for export and free delivery in the U.K. After sales service second to none.

- EC10 now only £59.10. 0.
- EB35 — £66.13. 4.
- EB36 — £56. 5. 0.
- 840C — £70. 0. 0.
- EA12 — £195. 0. 0.
- 940 — £143. 0. 0.
- 830/7 — £295. 0. 0.

Send today for full details

AT IMHOFS

Main Eddystone Retail Distributors for the London Area
Alfred Imhof Limited, Dept.12/4,
112-116 New Oxford Street, London WC1. 01-636 7878
R46

DUAL GATE MOSFET CONVERTERS



- 2 METRE FET CONVERTER. TIS88A cascode front-end. NF less than 1.0 dB. 2 MHz. bandpass coupler ahead of 3N141 dual gate MOSFET mixer. Cathodeon VHF sub-miniature crystal. Silicon planar injection stages. High Q break. Power: 12v. at 9 ma. D.C. Positive earth. IFs: 12-14, 14-16, 18-20, 20-22, 24-26, 28-30 MHz. £16
- 2 METRE SSB TRANSVERTER CONVERTER. Spec. as above less injection stages but including high Q break tuned to injection frequency. IFs: 14 MHz. (130 MHz. inj.); 28 MHz. (116 MHz. inj.). £12
- SATELLITE CONVERTER. 136-138 MHz. Spec. as 2 metre unit. IFs: 20-22, 28-30 MHz. £16
- FET PREAMPLIFIERS. Now available in the range 20-250 MHz. Bandwidth 5% of signal frequency. TIS88A cascode front-end. Bandpass coupler preceding 3N140 dual gate MOSFET cascode output. Gain 25 dB. NF at 150 MHz. 1.0 dB. £12
- 4 metre FET Converter. TIS34 cascode front-end. NF 1.0 dB Bandpass coupler preceding 3N141 dual gate MOSFET mixer. High Q break. Power: 12v. at 12 ma. D.C. Positive earth. IFs: 2.1-2.7, 4.1-4.7, 18.1-18.7, 28.1-28.7, 29.1-29.7 MHz. £16

Post and packing 3/9 per item

JXK CONVERTERS

Peel House, Porters Lane, Ospringe, Faversham, Kent.
Telephone: Faversham 2064

R. T. & I. ELECTRONICS LTD.

where equipment is fully overhauled

Table listing various electronic equipment with prices and descriptions. Includes items like TRIO JR500SE, Eagle RX80, COSSOR 1035 Oscilloscope, Solartron CD711S Oscilloscope, Heathkit RA/1, Eddystone 770R, Hammarlund H6-145-X, National NC-183-D, RCA AR88D, National NC 190, Hallcrafters S 27, Hammarlund H6-100-A, Eddystone 888A, Heathkit DX-100-U, Eddystone 840C, Eddystone 840A, BC-221 frequency meter, Hammarlund SP-600-JX, Eddystone 940, Koyo KTR/1661, and Dynamic Head Set HS4.

WE CAN ALSO SUPPLY ANY MAKE OF NEW EQUIPMENT—and have pleasure in giving a few examples, which are mainly in stock:—

AVOMETERS, Model 7, Mk. 2, £27; Model 40, Mk. 2, £27; Model 8, Mk. 3, £30; Model 9, Mk. 2, £30; Multimeter, Mk. £10/10/- (post free). S. G. BROWN'S HEADPHONES, Type "F", 120 ohms, 2,000 ohms, 4,000 ohms, £3/7/6 (3/6). Earpads for same, 8/4 per pair. Type 3C/1100 noise excluding (with superb fitting), high quality, electro-dynamic, £6/16/- (3/6).

KW EQUIPMENT. KW Atlanta transceiver, £250. Vespa Mk. 2. transmitter with A.C. p.s.u., £135. KW-201 amateur band receiver, £111. Also Calibrator, £6. "Q" mult., £8/10/-. KW-2000-A Transceiver, with A.C. p.s.u., £232; D.C. p.s.u., £42. KW-1000 Linear, £135. KW-600 Linear, £115. KW Vanguard, £85. KW E-Z match, £12/16/-. KW Match, £8/14/6. Antenna switch, £3/3/-.

CODAR, AT5, £16/19/6; 250/S, £8/10/-; T28, £15/17/6; PR30X, £7/19/6; CR70A, £19/10/-; 12/MS, £11/10/-; 12/RC, £2/10/-, etc., etc.

PARTRIDGE "Joystick" "Joystick", etc. Lists and details on request. TRIO EQUIPMENT. Receivers, JR-60-U, 540 kc/s.-30 mc/s. and 2 metres. £61/19/- (25/-); JR-50-SE, bandspread, £68 (10/-); 9R59DE, 540 kc/s.-30 mc/s., £37/10/- (10/-). 9R-59, 540 kc/s.-30 mc/s., £34/13/- (15/-). Loudspeaker, SP-5D "Speaker-mate" to match trio receiver, etc. £4/7/6 (7/6).

Our latest list of over 50 receivers, and many other interesting items sent free upon receipt of your s.a.s. CARRIAGE for England, Scotland and Wales shown in brackets. TERMS: C.W.O., Approved Monthly Accounts, Hire Purchase and Part Exchange. Special facilities for export. Enquiries invited

R. T. & I. ELECTRONICS LTD.

Ashville Old Hall, Ashville Road, London, E.11 Tel: 01-539 4986

SCA DERWENT RADIO S.A.E. 63982 LISTS SHOWROOM: 2 COLUMBUS RAVINE, SCARBOROUGH

Table listing various electronic equipment with prices and descriptions. Includes items like KW Atlanta and p.s.u., KW 2000A, KW 201 Receiver, KW 1000 Linear Amp, KW Vespa II and p.s.u., KW EZ match, KW I02 Bug Key, Eagle RF 45, Trio TS 500 and p.s.u., Trio 9R59De Receiver, Lafayette HA 600, Lafayette HA 700, G WHIP helical wound mobile whips, S.A.E. for leads, Tribander 10/15/20, Acos 45 microphone, Codar AT5, Codar T 28 Receiver, Codar 250/S, GAREX 2m. Converter, Eddystone EC10, Eddystone EA12, Stellar 940, Edar SR 700A Receiver, Star ST 700 Transmitter, Da-1 El. Keyer, Eagle SWR Bridge, Halson Mobile Whips, Halson Extra Coils, Katsumi El. Bug, Speech Compressor, Halson SWR Bridge, G Whip 160m. Ranger, 2 way Intercom, Codar 12/MS, Codar 12ERC, Codar PR 30X, GAREX jnr. 2m. Tx Kit.

ALL GAREX P.S.U. AND MODULATOR KITS ARE ALWAYS HELD IN STOCK

MOBILE SEASON

We have good stocks of Codar, G Whips, Halson and Garex but please order early to avoid the rush.

A large stock is held of R.S.G.B. and American publications including the new handbook, call books and log books. Our R.S.G.B. handbook sent post free when ordered with other items.

We would be pleased to hear about your trade-in equipment. HP on any items over £35 in value. One third deposit and up to two years to pay. Payments may be by Post Office Giro.

OUR GIRO ACCOUNT NUMBER 64 041 0006

Second-hand equipment in stock

Table listing various electronic equipment with prices and descriptions. Includes items like KW 201 Receiver and Cal., 70 cm. Converter and p.s.u., Eddystone EC 10, Heath SB 10u, Perfect, Minimitter MC-8 Conv., Class D W/meter, 230v., B2 "Spy" Tx/Rx, Eddystone EA 12, Trio 9R59DE, Viceroy IIIA, KW I60 Tx, Pye Ranger, Labgarr LG 50, Minimitter I50w, Tx, Minimitter MR 44/11, Eagle SWR Bridge, Heath R/C Bridge, Eddystone 840, Heathkit RAI, Heathkit GP/M16, KW77, Eddystone 720 (Rough).

Please add extra for carriage. S.A.E. for lists

WANTED: TW 2m. equipment, Gelloso VFOs, Eddystone 888As, Good AM/CW transmitters in top condition. Details please.

28 HILLCREST AVENUE, SCARBOROUGH, YORKSHIRE

SMALL ADVERTISEMENTS, READERS—continued

OFFERING: Discount 15% off any Heathkit short-wave, amateur, audio or instrument kits. This private offer will cease when total orders reach £175, so intending purchasers should apply immediately for full details, stating equipment required. (West Country.)—Box No. 4755, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Heathkit DX-100U CW/AM Tx, in excellent condition, with handbook and spare 6146, asking £45 or near offer. Will deliver within reasonable distance London. — Crump, G3VGC, 80 Lennard Road, London, S.E.20.

SELLING: KW-2000 with AC/PSU, not used since overhaul by K.W. Electronics (costing £17), price £120. Sommerkamp FT-DX500 Transceiver, as-new condition, £170. Mosley TA-33Jr Tri-Band beam, with 30ft. sectional mast and home-built rotator, £15. Large carbon resistors, 66 ohm 100 watt, just the job for that dummy load, 20s. each. (Bedfordshire.) — Box No. 4767, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: Nice Heathkit DX-40/VF-1U, £24. Latest Heathkit transistorised Car Radio, 12v., pos./neg. earth, mint condition, £11. Handbooks included, and delivery to 50 miles. — Carpenter, G3TYJ, 10 Avenue Road, Frome, Somerset.

EXCHANGE: VHF Receiver R.4593, tuning 30 to 100 mc in three switched bands, for AC mains, with meter and phones, compact, ideal amateur 4-metre or commercial bands, FOR Quality SSB HF communication receiver with product detector. Also wanted to purchase valves C.1134 and QV06-40A.—Macleod, 17 Vatisker, Stornoway, Isle of Lewis.

FOR SALE: Solartron CD.711S.2 Oscilloscope, perfect, at £58 or near offer. Wanted: R.308 receiver. Ring Gibbon, Windsor 63228 day-time, or Slough 43939 after 7.0 p.m.

SALE: National HRO-M receiver, in good condition, with nine GC/BS coil packs, PSU, speaker and manual. £27 10s. Avo Type CT.38 electronic multi-meter, in good condition, £20. Also R.1155L receiver, with PSU and output/speaker stage, in good working order. £12 10s.—Kneale, 10 St. John's Close, Stratton, Cirencester, Glos.

SELLING: Marconi CR-150/6 receiver, with power supply, excellent condition, £35. Philips 4-track tape recorder, £12. Eight-transistor LW/MW radio, 80s. Wanted to buy: Communication receivers, SSB transmitter, and compact 10-metre AM Tx.—Elkin, G8AMT, 10 Winterslow Drive, Leigh Park, Havant, Hants., PO9-5DX.

WANTED: Urgently, R.308 receiver in any condition (consider a wreck!) also any information about this Rx or where to find one. — Topham, G3WKB, 19 Highfield Avenue, Sale, Cheshire.

SALE: Avo Multi-Meter Mk. IV, complete with all leads, clips, prods, manual and leather case, £8. Brand-new gyroscope unit, ex-missile, 18s. 6d. Marconi Valve Voltmeter, £15. Compact VHF Rx, tunable 80 to 200 mc, with AC/PSU and speaker. £25. Manuals: For R.208 and VHF calibrator Type 18, 20s.; for Rebecca Test Set 31 and VHF Calibrator Type 120, 30s.; for Canadian W.S. 58, 25s. Circuits for RX.31 BC-1000, 5s. and for Performance Tester Type 102, 20s. Carriage extra. Pse include s.a.e. with enquiries. — Hayward, Sunnyfields, Lighthouse Road, St. Margaret's Bay, Near Dover, Kent.

FOR SALE: K.W. Vespa Mk. II, one year old and little used, £90. BC-221 frequency meter, £10. Wanted: Hammond, M or L. — Wyatt, G3KNJ, QTHR.

SELLING: Eddystone EA-12, new and unused in carton, with headphones (value £8 15s.) all-in at £160. (Midlands.) — Box No. 4769, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: R.C.A. AR88D, reconditioned case, with S-meter, manual and a few spare valves, going for £45.—Leighton, 12 Morley Avenue, Connaught Quay, Deeside, Flintshire.

SMALL ADVERTISEMENTS, READERS—continued

WANTED: Now or second-hand, RSGB "Bulletins" for year 1967 (preferably bound) or would consider series of years including 1967. Details and price, to include postage, *pse.* (Hampshire).—Box No. 4768, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Heathkit DX-100U transmitter. State age, condition internal and external; realistic prices only, *pse.*—Box No. 4773, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: KW-2000 Tx, must be in good condition. All letters answered and will collect.—Acton, 45 Dunchurch Crescent, Parklands, Sutton Coldfield, Warwickshire.

AVAILABLE at Godshill, Isle of Wight: Bed-breakfast accommodation with evening meal; hot and cold in all rooms; TV lounge; and children welcome. Also an all-electric 4-berth caravan, with main water and flush you-know. Write for terms.—Berden, G3RND, Bridgecourt Farmhouse, Godshill.

SURPLUS: Top quality polypropylene non-rot rope. Diameters: $\frac{1}{2}$ in., 1300 lbs. breaking strain; 5/16in., 1890 lbs. B/S; and $\frac{3}{8}$ in. dia., 3100 lbs. B/S. Send s.a.e. for sample.—Powell, GW3HUM, 21 Tanybryn Estate, Valley, Anglesey.

SALE: National NCX-5 Mk. II, with 240v. PSU, perfect condition and hardly used, £240. NC-183D receiver, perfect, £95. Callers preferred.—Longmire, G3TKL, QTHR, or Tel. Thornton 2363 (Blackpool).

GOING QRT: For Sale, the following items: Heathkit DX-100U, £45. K.W. Viceroy Mk. III, CW/SSB, very little used, £80. KW-500 Linear, with spare 813, £40. Heathkit SB-400, new 6146's, £80. Heathkit reflected power meter, HM-11, £5. Heathkit valve voltmeter, 1M-13U, with RF probe, £12. Heathkit Q-multiplier, £5. Heathkit GDO, £5. LM-14 frequency meter, with PSU and charts, £15. Valve tester I-177-B, with PSU, £10. Galvanised Heathkit tower, £20. Mosley A203-C 3-ele beam for 20m., £20. Mosley 3-ele Elan Beam, with TR44 rotator (gear box requires attention), £25. Everything in very FB condition. Prefer buyers inspect and collect.—Gowen, G3RQN, 61 Westerleigh Road, Yate, Bristol, BS17-4BQ.

WANTED: Receiver for Scout Group, around £10. Also 19in. rack, handbook and S-meter for 888A. Handbook and PSU's for K.W. Valiant and Minimitter Converter. Aerial relay, rated 150 watt. Collection arranged if local.—Vella, 78 Hurst Road, Sidecup, Kent. (Tel. 01-300 5891.)

SELLING: Ultra 12in. TV, 1968 model, BBC1/ITV, price £30, or Exchange for recent Eddystone receiver. (Essex).—Box No. 4771, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: CR-100 receiver with S-meter and additional slow-motion dial, in good condition, £15. Also Codar RQ-10X Q-Multiplier, almost new and in excellent condition, £7 10s. Send s.a.e. with enquiries.—Bunyan, 20 Gayhurst Drive, Sittingbourne, Kent.

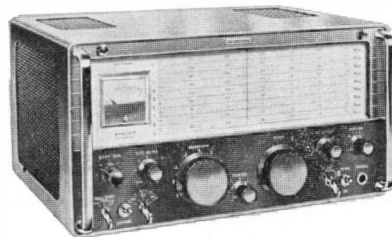
FOR SALE: R.206 receiver, covering 550 kc to 30 mc in six bands, with PSU and Minimitter converter to spread amateur bands. Good as ever, no trouble in 15 years. With instruction book. Offers over £15, please.—Whitehead, 91 Blackpool Road, Andsell, Lytham, Lancs. (Tel. Lytham 7680, evenings.)

SELLING: KW-2000 with AC/PSU, pre-G-line model, in excellent condition but could do with realignment, price £120 or near offer.—Webb, G3NDK, 9 Abbey Close, Tattershall, Lincoln. (Ring Coningsby 571, evenings; away until April 7.)

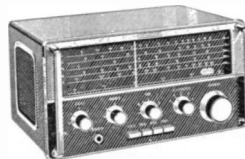
SALE: Marconi CR-150 receiver, with matching PSU and speaker, condition immaculate, price £35, no offers. (Hants).—Box No. 4772, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SELLING: Brand new Trio JR-500SE receiver, only two weeks old, and boxed, price £45.—Ring Capell, 01-749 1863 (London).

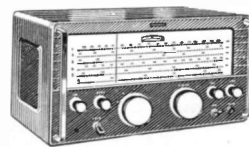
EDDYSTONE IN DEVON



EA12 £195



EC10 £59.10.0



840C £70

FULL H.P. FACILITIES

S.A.E. FOR LISTS

GRAHAM NEWBERY

(Reg Ward, G2BSW)

AXMINSTER DEVON

Phone: Axminster 3163

S.S.B. PRODUCTS

SPECIALIST IN MAIL ORDERS FOR AMATEURS

SPECIAL OFFER!!

COLLINS 75S3 with 160m. Converter £220
Packed in original carton—with all circuits.

TRIO TS500 TRANSCEIVER. P.S.500 and VFO.5 All brand new, boxed (2 only) ...	£199
TRIO JR500SE. 80-10m.	£68 (£1)
TRIO 9R59DE. General coverage Rx.	£39 (£1)
RAI Rx.	£33 (15/-)
COSSOR 339 and Wobbulator	£27 (30/-)

DELTA CONTROL UNITS. Changes over your Co-axial cables and mutes Tx and Rx. A.C./mains i/p Only	£7 10s. (6/-)
6HF5 VALVES. New (matched pairs £4 5s.) ... each	£2 (2/3)
6146 VALVE. New (matched pairs) ... each valve	35/- (2/3)
6HF5 BASES. Offered at ... Post free each	5/-
BM3 MICS. Offered at each	32/6 (4/6)

2 METRE WIDE SPACED 5 ELEMENT YAGI with 1-2 1/2" adjustable bracket	49/6 (7/6)
FEW CALIBRATOR XTALS. 1000/100 kc/s. All tested. New. Two in one for	50/- (2/-)

MODERN CABINETS, CHASSIS AND PNLS. Marvellous bargain. Six colours. 15" x 6" x 12" deep
Only

SCARAB LATTICE XTAL FILTER KITS. Complete with Tx. Layout and carrier xtal, etc. Only ...	£7 10s. (2/-)
DAI ELECTRONIC KEYERS. Two left. New each	£16 (4/6)
100 watt DUMMY CARBON LOADS— Co-ax i/p. ...	£3 (2/-)
800 watt PYRAMID LINEAR KITS	£55 £1 10s

G2DAF-TX, RX, HC6/U. NEW XTALS
PART EXCHANGES PLEASE SEND S.A.E.

7a LITTLE CASTLE STREET, TRURO CORNWALL

SHACK STANDARD



Precision Laboratory Frequency Standard. 100 K/Hz. and 10 K/Hz: BTG 5° X Cut Bar Quartz Crystal. All silicon solid state circuitry. An essential piece of equipment in every enthusiasts workshop. Price: £12. 18. 6 Postage 4/6d. For details please send S.A.E. to:

TIMES INSTRUMENT CO.

3 STATION ROAD, GREAT SHELFORD,
CAMBRIDGE, ENGLAND

G3LRB

G3MCM

STEPHENS-JAMES LTD.

New KW Atlanta. 500 watts P.E.P. input. 80-80 metres with A.C. p.s.u., £250.

New Styling KW2000B Transceiver. 180 watts P.E.P. 10 to 160m. with PTT, VOX. Complete with A.C. p.s.u., £232; D.C. p.s.u., £42.

KW Vespa Mk. 2. 220 watts P.E.P. Complete with A.C. p.s.u., £135.

KW E-Z Match ... £12. 10 KW 3 way antenna switch ... £3. 10

KW Baluns ... £1. 15 KW Low pass filters ... £4. 14

Lafayette HA600. Solid state 5 band receiver. 50 Kc/s. to 400 Kc/s. 550 Kc/s. to 30 Mc/s. F.E.T. Front end. Two mechanical filters, £45.

Star SR200 RX, 8 valves. Full coverage all bands, 160 to 10 mtrs. Crystal Calibrator. Solid state p.s.u. ... £40

Trio JR-500 Receiver. 80-10m. Full coverage each band. Solid state VFO. Crystal controlled, £69. 10.

Trio 9R59-DE. 550 Kc/s. to 30 Mc/s. Bandspread on amateur bands. Mechanical filter, £42. 10.

Superior performance mobiling with the G-Whip range of antennae. Lightweight design. Helical wound. New ranger 160 metre one bander, £7. 19. 6. Tribander 10-15-20m., £8. 16. Duo-bander, 160/80m., £9. Single banders, £4. 7. S.A.E. for full details.

NEW. All band "Multimobile" self selecting mobile antenna. Covers 5 bands without any coil changing.

Now the New Mini G-Beam. 2 element 15 metre, 12ft. mini. elements, 5ft. boom. Turning radius 6ft. 6in. Lightweight, £15. 15. S.A.E. for details.

Hansen SWR Bridges ... £3. 10

TTC C3005 two meter SWR Bridge, suitable up to 200 Mc/s. ... £6. 6. 6

Hansen FS-1. Field strength meter ... £2. 5

TTC RF Meter. Tunable ... £3. 19. 6

High pass filters ... £1. 5

Egg insulators ... 6d.

Ceramic insulators ... 1. 0

300 ohm twin feeder ... 8d. yd.

75 ohm twin feeder ... 7d. yd.

50 ohm coaxial cable ... 1. 9. yd.

Dipole "T" pieces ... 1. 6

PL259 plugs ... 6. 0

PL259 cable reducers ... 1. 6

Semi-Auto-bug keys ... £4. 10

Tech TE-15. Transistorised GDO covers 440 Kc/s. to 280 Mc/s. ... £11. 10

Chassis from ... 3. 6

Aluminium panels from ... 1. 0

Diecast boxes from ... 8. 6

Metal boxes from ... 9. 6

Dynamic Microphones with PTT switch ... £3. 7. 6

Test Meters from ... £2. 5. 6

Crystal Microphones from ... £1

RSGB Publications

Fantavox Aircraft Receiver ... £8. 7. 6

Aircraft receivers by Park Air Electronics, Volstatic, AIWA, Nova Tech.

AR-158 Transistor Receiver. 6 band A.C./D.C. including aircraft VHF/MED/FM/160m. ... 38 gns.

H.P. and Credit terms arranged on orders over £35. Part exchanges. Carriage/postage extra all items. S.A.E. enquiries please.

70 Priory Road, Anfield, Liverpool 4

Tel. 051-263-7829. Half day Wednesday.

We are approximately 1/4 mile from the Liverpool and Everton Football grounds. No parking problems.

SMALL ADVERTISEMENTS. READERS—continued

WANTED. K.W. Vanguard, Panda Cub, Minimitter Top 2-7. For Sale or Part Exchange: Eddystone EC-10, fully transistorised, in new condition, £35 or offer, carriage paid.—Griffiths, G2DFH, 4 Westbourne Terrace, Saltash, Cornwall.

WANTED: Manual for Cossor 3339 'Scope, your price paid.—Burgess, 4 Marine Terrace, Rhosneigr, Anglesey.

SALE: Collins KWM-2 Transceiver, 399C/1 PTO and Speaker, PM2 AC/PSU, PM1 12v. DC/PSU, 351D/2 Mobile Mount, 136B/2 Noise Blanker, CC2 Carrying Case, all-in at £550 or near offer; might split. Also on offer, one new and boxed 4CX1000A valve, and 2/4X500A valves in good condition, with bases; offers?—McCarty, G3OEM, 1 Baden Road, Brighton 7, Sussex. (Tel. Brighton 65132, evenings.)

HOLIDAY Accommodation: Private amateur-radio household, with fully equipped station. Transport to and from the Airport.—Machen, 9H1R, No. 1 Jarmine Path, Santa Lucia, Malta, G.C.

SALE: Loot Needed! National HRO, nine GC coil packs, with PSU, speaker and headphones, all in nice condition. £25. Lorenz LO-15 Page Printer, with table, spares and manual, excellent condition, £27. Admiralty Type FAE RTTY T.U. with spare valves and manual, works well. £17. Hefty equipment bench, home-built, 60s. Also manual for RTTY Unit Type 242. ex-R.A.F., 15s. The Lot for £65, or will haggle over individual items. Fuller details and demonstrations given.—Wickstead, 11 Norman Road, Ilford, Essex. (Tel. Home 01-478 5057; Office 01-734 0896.)

WANTED: Heathkit HP-13 Mobile PSU. For Sale: G2DAF linear amplifier, pair 4-250's, with 3-5 kV Variac/PSU, bargain at £50. Marconi FSK Monitor unit, brand new, £20. HT transformer, 0-2800v. at 300 mA, ideal for big linear, £5.—Martin, G3UDR, Rew Cottage, Abinger Common, Dorking, Surrey. (Tel. Abinger 114.)

FOR SALE: Receivers Star SR-200, £27 10s.; Heathkit Mohican, £27 10s.; Marconi CR-100, working FB, £10; all with manuals. Eddystone S-meter unit, 50s. Oscillator G.44, 55 to 120 centimetres, 40s. Solartron AS.517 high-stability PSU, 80s. Collaro transcription turntable, £5. Garrard Lab. A autochanger, £7 10s. Offers considered. Carriage extra. For details s.a.e., please.—Hunt-Duke, 18 Hawkins Road, Folkestone. (Tel. Folkestone 75388, business hours.)

CERAMIC capacitors: 1000 pF feed-through, solder-in, 4s. 6d. doz., nut fixing 8s. 6d. doz., or 9d. each. Disc types: 1000 pF, 750v., 1s. 6d. dozen; .01 mF, 350v., 2s. doz.; .01 mF, 750v., 2s. 6d. doz. Mallard tubular ceramic trimmers, nut fixing, screw adjustment: 0.7 to 3 pF and 0.8 to 6 pF, 1s. 8d. each; 0.9 to 12 pF, 1s. 9d. each. Ferrite beads, Neosid F.14, 1s. 9d. doz. Cash with order plus 1s. post/packing.—Bryant, G3WIE, Stockwich Farm, Bridgehampton, Yeovil, Somerset.

ACTIVE Amateur or Keen SWL may like to share flat in Potters Bar, Herts. Plenty of aerial space, 10 to 160m. SSB station, operational. Suggest young chap in 20's who could afford 90s. a week.—Cragg, G3UGK, QTHR.

SELLING: QRO PA, 2/813, tank coil for 160m. upwards, not very pretty but what do you expect for £8? Also 2 kV PSU, giving various other voltages, suitable to power this PA, Class-C or Linear; EHT line solid state; bulky job, hence only asking £12 delivered in G, GM or GW. Heathkit dummy load, including extra cooling oil, 80s. (Herts).—Box No. 4774, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

EXCHANGE or Sell: A large selection of high-quality, e.g., Pyrex, glass-ware and accessories for chemistry, £7. Or Exchange this lot for R.1155 Rx and PSU in good condition and in working order. Send s.a.e. for full details.—Miller, 22 Belmont Road, Belmont, Sutton, Surrey.

SMALL ADVERTISEMENTS, READERS—continued

SALE: Heathkit RA-1 receiver, with manual, little used and absolutely perfect, price £30 or sensible offer, carriage paid.—Darrah, Greenhaven, Southdowns Road, Bowden, Cheshire. (Tel. Altrincham 3560.)

OFFERING: R.C.A. AR88D Rx, excellent performance on all bands, cabinet almost unmarked, complete with two spare valves and knob key, price £50. Inspection invited. — Ramsey, 12 Mayfield Road, Northfleet, Gravesend, Kent.

OFFERING: Mechanical filter, Lafayette MF455, for 455 kc; 10AZ27, 2.4 kc. Will Exchange for 3 kc, or wider, with cash adjustment. For Sale: Complete two-metre station, price £25, s.a.e. for details. MW Command Rx, 70s. BC-453 plus 160m. converter, £5 10s. And 80m. Mark Heliwhip. 45s.—Dumbleton, G3HCM. QTHR. (Tel.: Coventry 73460.)

REQUIRED: High-band Pye Ranger, or similar. In working condition preferred. — Clay, 51 Botany Lane, Lenton, Huddersfield, Yorkshire. (Tel.: Kirkburton 2668.)

AWAITING posting: G3OLV wishes to sell five-month-old Inoue 700 Line Transceiver, with PSU, in immaculate condition and in original boxes. For details see Lowe Electronics advertising prior to December '68. Price now asked £150, or near offer.—Coombes, G3OLV, QTHR, or ring Reeth (Yorkshire) 333.

WANTED: To buy, hire, or on loan, handbook for R.1475 receiver, or correspond other owners. — Pascoe, 26 North Parade, Falmouth, Cornwall.

SALE: Trio 9R-59DE receiver with extras, including crystal-controlled BFO, crystal calibrator, voltage regulator and speaker, in mint condition. First £30 secures.—Box No. 4775, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

EXCHANGES: B.40 receiver. Dulci 15-watt amplifier with preamp. Tandberg Master stereo recorder Model 3 (cost 114 gns.). Phillips professional dictation outfit, cassette loading (cost £75). Quad II 15-watt amplifier. **WANTED:** Transistor radios with short-wave coverage, or top-grade mains receiver. (Glasgow).—Box No. 4776, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SELLING: Eddystone EC-10, £36. Hallicrafters S.36A VHF receiver, 28 to 145 mc, with manual, £26. Lafayette HA-350, 10 to 160m., with xtal calibrator and manual, £49. All in good condition. Prefer buyer to collect, if possible. — Wyse, G3IWE. 36 Wilmslow Crescent, Thelwall, Warrington (64178), Lancs.

CLEARANCE: Valves, all types.—Richards, G3LHR, Tel.: 01-639 1733.

SALE: New Eddystone EC-10 Rx, at £10 off list price. Offers invited for Eddystone S.750 receiver with speaker; S-meter. Leak Varislope and TL.25. Part Exchanges welcome.—Snowden, Swainsea Lane, Pickering, Yorkshire.

RADAR DETECTION INSTRUMENT

PROTECT YOUR DRIVING LICENCE WHICH IS PRICELESS! Completely self contained, ready to clip on sun visor. Detects radar speed traps and is covered by domestic licence. Ham and Radar Scatter signals picked up even round bends. (Up to 2 miles warning on Motorways).

Fully guaranteed. Size: 4½" x 3½" x 3" £13.5 0 inc. P/P. For details ring 01-660 2896 or 8d. stamp. No extra charge for C.O.D. **Belding & Bennett Radar Div., (Box 14) 45 Green Lane, Purley, Surrey**

HALSON MOBILE ANTENNA—THE MOBILE SCENE

The Most Efficient! The Most Unobtrusive! and Best Loaded too
A COMPLETE MOBILE ANTENNA SYSTEM
Completer or one band, £6/17/6 + 3/6 P.P. Extra coils, £3/17/6 + 3/- P.P.
SWR and FSL, £4/19/6 + 3/6 P.P.

Our Agents: K.W.—Kent. N.W.—Manchester.
Chas. Young—Birmingham. Swanco Products—Coventry.
G. Francis—Newark. G. W. Smith—London.
Glasgow Electronic Services—Glasgow C.3.

Or direct from **HALSON ELECTRICAL SERVICES**
DOVER ROAD WORKS, ANSDALL ROAD, BLACKPOOL
Tel. 62740



VHF COMMUNICATIONS

VHF COMMUNICATIONS has specialised itself to the publishing of exact and extensive assembly instructions for transmitters, receivers, converters, complete transceivers, measuring and auxiliary equipment, antennas, etc. which can be easily duplicated. It also features information regarding the development of electronic equipment, measuring methods, as well as technical reports covering new techniques, new components and new equipment for the amateur. The latest advances in the semiconductor, printed circuit and electronic technology are considered in great detail. All special components required for the assembly of the described equipment, such as epoxy printed-circuit boards, trimmers and coil formers, as well as complicated metal parts and complete kits, are available either from the publisher or national representative.

VHF COMMUNICATIONS is a quarterly, published in February, May, August and November. Each edition contains approximately 60 pages of technical information and articles. The subscription rate is £1 7s. 6d.; individual copies are available 8s. 6d. each.

Editors: Robert E. Lentz, DL3WR.
Terry D. Bittan, G3JVQ/DJ0BQ.

Publisher: UKW-BERICHTE
D-8520 Erlangen, Gleiwitzerstr. 45.
Federal Republic of Germany.

Representative for U.K.: D. T. Hayter, G3JHM,
4, Newling Way, Worthing, Sussex.

A. J. H. ELECTRONICS
(G8AQN)

2 METRE 10XJ TYPE CRYSTALS

8-007-27	8-010	8-015-45	8-040
8-007-69	8-013-75	8-035-38	8-080
8-003-24	8-015	8-036-25	8-032

Prices 1 off 10/-, 2 off 19/6, 3 off 27/6, 4 off and above 8/6 each

4 METRE 10XJ TYPE CRYSTALS

7-790	7-820	7-830	7-850
-------	-------	-------	-------

Brand new crystal holders types 10XJ, HC6/U, FT243, 1/6 each.
Valve I.F. transformers 465 Kc/s. ½" sq. x 1½" long P.C. type, 2/- each, 3 for 5/-.
Transistor I.F. transformers 470 Kc/s. single tuned approx. .4" x .3" x ½" high, 1/6 each, 4 for 5/-.
Set of 3 transistor I.F.s. two double tuned one single tuned for detector very small type with circuit, 12/6 set.
Tuning capacitors 325 pf, + 375 pf, + approx. 20 pf + 20 pf for F.M. size 2½" x 1½" x 1½" with 6-1 reduction drive antibacklash gears, brand new, only 4/6 each.
Unmarked silicon diodes SX633 300 p.i.v. at ½ amp. tested and guaranteed, 9d. each, 6/- doz.
Unmarked OA91 type diodes, all tested, 6d. each, 4/- doz., 24 for 6/-.
BY100s, unmarked, tested, guaranteed, 3/- each, 30/- doz.
GT45B equiv. to OC45, OC71, etc., manufacturers marked, 1/3 each, 12/- doz.
AUY10, brand new manufacturers marked few only at 25/- each, OC29 brand new, 10/-.
Disc ceramics .01 500vw. P.C. type, 2/- doz., .047 30 vw. P.C. type, 3/- doz., 1800 pf 1000 vw., 3/- doz., .02 500 vw., 3/- doz. Both types wire ended (all ERIE).
Hunts .25 mf. 350 vw. ½" x ½" wire ended, brand new, 4/- doz., 6d. each.
Mullard 50 + 50 + 50 mf. 350 vw. can type electrolytics, 5/- each.
Tubular trimmers .5-5 pf. vertical mounting UHF type (not ceramic) ½" x ½", 4/- doz.
Thyristors 400 p.i.v. at 5 amp. for drill speed controls, etc., 12/6 ea. P.C. boards drilled and etched 3½" x 2½", ideal for mock ups, 3d. each, 2/6 doz.
50 pf transmitter type tuning capacitors, 5/- each.
Postage under £1 + 1/6 £1-£3 + 2/3 £3-£5 + 3/6
MAIL ORDER ONLY S.A.E. FOR LISTS

59 Waverley Road, The Kent, Rugby, Works.
Tel. Rugby 71066

TAURUS ELECTRICAL SERVICES

Prop. G3TED

Transistor Panels Ex NEW Computer. Marvellous value. Good selection. £1 lots, post paid.
 Mixed Transistors on Panels with Diodes, etc. Types: BCY30 2N1500, 2N1499A, MDS31, GET882, 2S103, GET104, OC203, 12 and 15v. Zenners, etc. All guaranteed panels with at least 20 transistors plus various components. All new Bargains at 20/-, post paid.
 Silicon Planar Transistors by Fairchild P346 N.P.N. 550 Mc/s., working, 7/6 each, post paid.
 600M Amplifiers. 19" rack mounted, Mains supply, £3.
 Lightweight headsets. 600Ω imp., 9/6, post paid.
 Transistors, A.F. and R.F. 3/9 dozen, post paid.
 New Ferrite Pot Cores, 1/6 each or 15/- dozen, post paid.
 Transistorized Morse Oscillator Modules. Will drive speaker or phones. 18/9, post paid.
 G.V.03/12 or 10, 15/-, post paid.
 New and Boxed Mains Relays, 2 pole 2-way octal base, 17/6, post paid.
 New Jack Plugs 2/6; Jack Sockets, 2/9 or 5/- pair, post paid.
 Tank Aerials. Three 4" sections making 12", 8/6, P. & P. 5/- any number Bases, 4/6. P. & P. 2/-.
 Breast Sets. Safe for Mobile Operation, 10/-, post paid.
 Xtal Insets to fit above Breast Sets, 7/6. P. & P. 9d.
 Creed 7B Teleprinters. Used, £15. P. & P. 30/-.
 Creed 7B Teleprinters. As new, £30. P. & P. 30/-.
 All spare parts for Creed 7B Teleprinters in stock.
 Head Sets. 19 set type or type DLR, 11/-, post paid.
 Small Stand-off Insulators by Eddystone, 1/- each.
 Dry Battery Packs. 72 and 1 1/2 and 1 1/4, 4/6 each. P. & P. any number 3/-.
 New Key Switches. Less knobs, 2/6. P. & P. any number 1/-.
 New Small Condensers, Not Junk. 200 for 25/-, post paid.
 Multi-Test Meters. 100Ω/V., 37/6.
 Multi-Test Meters. 20,000Ω/V. With cut-out, 73/-, post paid.
 Xtal Lapel Mikes. Complete, 6/6.
 Miniature Indicator Lamps, L.E.S. Red, blue, yellow, white. Smart looking, 2/6 each.
 B40 Receivers. Air tested, £22, post paid.
 SPECIAL OFFER OF MIKES. D x 73 Pizo Dynamic, 32/6, post paid.
 M.S.11. Dynamic with Flexible Desk Stand, £3, post paid.
 ACOS Xtal (metal), MIC45, £1 2/6, post paid.
 CM20 Xtal (plastic), 9/6, post paid.
 CM70 Xtal Stick with Accessories, £2 7/6, post paid.
 VALVEHOLDERS, B9A and B7G, 8d. each, Octal Ceramics, 1/3.
 BY100 Rectifiers, 3/9 each, 5M78P Silicon 800PIV 750M/A, 3/9.
 Thyristors, 400 PIV 8 amps, 9/6 each.
 Jap Vernier Slow Motion Dials. 50 mm., 10/-; 70 mm., 12/6, post paid.

26/28 NOTTINGHAM ROAD, LOUGHBOROUGH, LEICS.
 Telephone 5131

G5JV REX RADIO G3JVM

NEW TRIO EQUIPMENT:

9R59DE. Continuous coverage receiver, 550 kHz to 30 MHz (4 bands) incorporating mechanical filter £39 15 0
 JR500SE. Amateur bands only 3.5 MHz to 29.7 MHz (7 bands). Exceptional stability through use of crystal controlled first oscillator and transistorised Vaccar variable frequency oscillator for tunable I.F., for selectivity a mechanical filter is used £68 0 0
 TS500. S.S.B. Transceiver 3.5 MHz to 29.7 MHz (7 bands) Double conversion. 200W PEP input on S.S.B. and C.W., 17 valves, 3 transistors and 15 diodes. Built-in crystal calibrator, plus many other features. Only £162 0 0
 PS500. A.C. power supply and speaker unit for above £38 0 0
 VFO 5. Variable frequency oscillator for use with TS500 to enable complete split frequency operation, as on all Trio 500 series direct reading of frequency at 1 kHz intervals £28 0 0
 PICKSTONE. Instant heat soldering irons £3 9 6
SECOND-HAND:
 HEATHKIT (Factory Assembled). R.A.I. with calibrator, Q multiplier, matching speaker, and complete service manuals. Mint. Nobody seemed to want it at £50 so what about £40 0 0

WANTED:

Codar AT5 Transmitter and T28 Receiver with Mobile P.S.U.
 Your old equipment taken in part exchange or bought for cash.

329 Kilburn Lane, London, W.9
 Telephone: 01-969 1770
 SHOWROOMS AT 301 KILBURN LANE W.9

BAGINTON ELECTRONICS

G3TFC (SALES Ex ZC4JC

RCA AR8516L. Overhauled by R.C.A. in 1968. 80 kc-30 mc., AM/CW/SSB, 18 valve triple superhet, with 2m. converter £165
 STC STR12 C/D. VHF TX/RX. ... 118-131.9 mc. 140 channels spaced 100 kc, Tx output 10 watts. Suitable as transverter source of RF between 130 and 131.9 mc + 14 mc. = 144-146 with 14 mc. VFO 100 kc. sweep. Tx strip will be removed unless callsign stated in order. With interconnection diagrams.
 Control unit Carriage 4/6 £3
 Tx/Rx unit Carriage 10/- £18
 Modulator/Audio Carriage 10/- £6
 Dynamotor if required Carriage 4/6 £3
BENDIX IGNITION ANALYZER SCOPES, TYPE
 11-3398-1, 115v. 50-400c/s. 26lb., 8 x 8 x 20". Carriage £1 £15
MARCONI RX. 1616. 2-18.5 mc. I.F.'s, less valves (CV 138, CV131, etc.) and some components, for breakdown. P. and P. 10/- 30/-
CLASS D No. 2 WAVEMETERS. 1.2-19.2, heterodyne and absorption 12v. D.C. and mains p.s.u. built in. With phones and instructions Carriage £1 £14
LM WAVEMETER. Heterodyne, like small BC221, same range, with modulation, power plug, charts, p.s.u. Instructions Carriage 10/- £20
MARCONI MODULATORS. 90w., circuit, clipper, filter, 8 x 6 x 16". Wt. 20 lbs. Carriage 10/- £4
PTR61ES. Tx/Rx 132 mc., 12 volt p.s.u. 8 x 6 x 12". With circuit. Two available. Carriage 10/- £10
R209 RX. 6 volt. 1-20 mc. Carriage 10/- £12
BEAM HEADING INDICATOR SYSTEM. 6v. D.C. 100 ma. £4
XTALS for 4. 7783, 7800, 7816, 7833, 7850 each 15/-
 8 mc B7G glass, wire ends, for band edge marker each 22/6
XTALS in 80-40-20m. bands, 15/- each. Large stock of Xtals, newly arrived, miniatures between 12.3 and 15.3 mc., 10/- each.

S.A.E. Enquiries

BAGINTON ELECTRONICS (SALES)
 Market Corner, Baginton, Warks. (near Airport)
 Postal Code CV3-8AP. Tel. TOLL-BAR 3688
 Robophone 24 hour service.

Carlton Hill Amateur Radio Nottingham

G 3 Q Y

Second-hand

Direction Finding Receiver Unit FHBDE55
 1-22 Mc/s. £55
 AR88D. Very clean £45
 Hammarlund HQ120 £28
 Marconi CR 300 £14
 Canadian 52 Rx. £13
 Star CR 150. .55-30 Mc/s. £13
 K.W. Viceroy. Solid State p.s.u. £85
 KW Vanguard £33
 Labgear Twin 160 £18

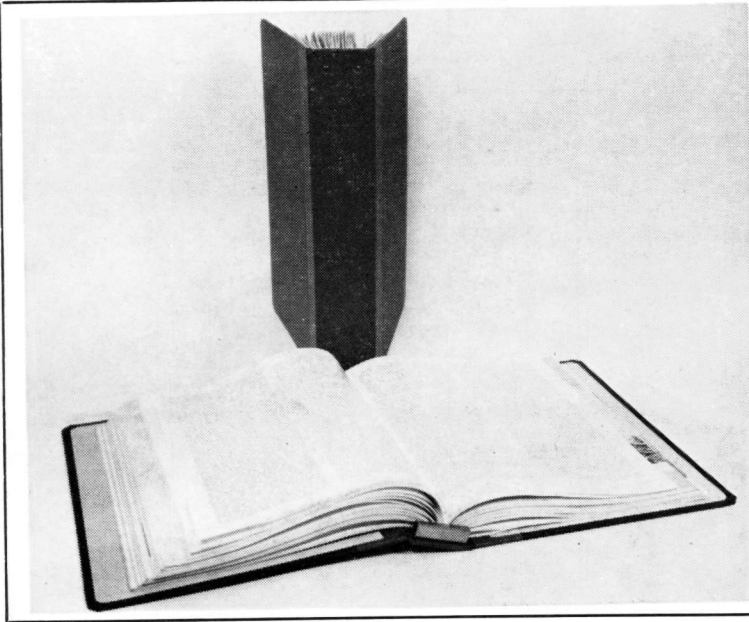
H.D. Power Unit Transformers, Chokes, Condensers (Sprague)

Transistors, RF and Audio

HF and VHF Components

410 CARLTON ROAD, CARLTON, NOTTS.

Open—Mon.—Wed.—Fri. and a.m. Sat.



CREATE YOUR OWN REFERENCE LIBRARY

The "EASIBINDER" is designed to bind 12 copies of the Magazine as you receive them month by month, eventually providing a handsomely bound volume for the bookshelf.

No need to wait until twelve copies are assembled. As each copy is received, it is quickly and simply inserted into the binder. Whether partially or completely filled, the binder is equally effective, giving the appearance of a book, with each page opening flat.

Strongly made with stiff covers and attractively bound in maroon Leathercloth and Milskin, the binders have only the title gold blocked on the spine.

Price 14s. 6d. post free.

PUBLICATIONS DEPARTMENT
SHORT WAVE MAGAZINE
55 VICTORIA STREET
LONDON, S.W.1

Advertising in "Short Wave Magazine" guarantees the largest and most effective coverage of the U.K. radio amateur interest

IT'S HERE —

IT'S SPRINGTIME!

AND SPRINGTIME IS ANTENNA TIME



MOSLEY



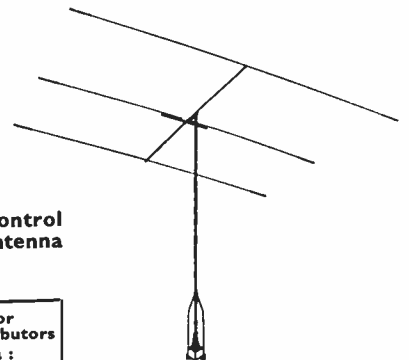
V-3 Jr.

BACK BRITAIN
Manufactured 100% in England

- | | |
|-----------|-------|
| ELAN | SWL-7 |
| TA-33 Jr. | RD-5 |
| TA-32 Jr. | A-315 |
| TA-31 Jr. | A-215 |
| V-3 Jr. | A-310 |
| VTD-3 Jr. | A-210 |
| TD-3 Jr. | |

Imported Antenna's

- | | |
|------------|---------------|
| Classic-33 | Lancer Mobile |
| A-203-C | V-4-8 |
| TA-36 | A-92-S |
| TA-33 Snr. | TD-2 |
| TA-32 Snr. | DI-10 |
| V-4-6 | RV-4RK |
| RV-4 | |



ELAN

Rotators, Towers, Polythene cord and rope, Coax cable, Control cable, Twin feeder, SWR indicators and many more Antenna accessories.

Send for NEW HANDBOOK/CATALOGUE containing full details and prices of Antennae and technical information, 35 pages 2/6 refundable on purchase of an Antenna.

Carriage and Insurance Extra

We sell direct or through our distributors
Southern Area :
K.W. Electronics Ltd.
Midland Area :
Swanco Products Ltd.

Telephone: Costessey 2861, orders only

Mosley Electronics Ltd. 40, Valley Road, New Costessey, Norwich, Norfolk Nor. 26K

BOOKS IN STOCK

Amateur Radio Construction Projects	21/-
(Foulsham)	
Beginner's Guide to Radio	9/-
(Newnes)	
Beginner's Guide to Colour Television	15/8
(Newnes)	
Beginner's Guide to Electronics	16/-
Electronic Transistor Circuits	25/9
(Foulsham)	
Engineers' Pocket Book	15/10
(Newnes)	
Q. & A. On { Audio	10/-
(Newnes) { Electronics	10/-
{ Transistors	10/-
Handbook of Transistor Circuits	36/-
(Foulsham)	
Introduction to Valves	9/4
(Iliffe's)	
Practical Transistor Theory	21/-
(by E. A. Wiesner)	
"Radio"	13/9
(by David Gibson)	
Radio Astronomy for Amateurs	31/-
(by Frank Hyde)	
Radio Engineers Pocket Book	11/-
(Newnes)	
Radio Experiments	17/3
(by F. G. Rayer)	
RCA Silicon Power Circuits Manual	23/-
RCA Receiving Tubes Manual	23/-
RCA Transistor Manual	23/-
RCA Transmitting Tubes	15/-
Shop and Shack Shortcuts	34/6
(by W6TNS)	
Short Wave Listening	13/5
(by J. Vastenhoude)	
Short Wave Listeners' Guide	13/8
(Foulsham)	
Transistor Fundamentals Volumes I, 2 & 3	36/6
each	
Transistor Pocket Book	26/6
(R. G. Hibberd)	
Transistor Transmitters for the Amateur	22/-
(Foulsham)	

CALL BOOKS

"G's" (1968/1969) 7/3

SPRING EDITION

"DX Listings" £2/3/-

"U.S. Listings" £3/4/6

The two together, covering the World £5/2/6

MORSE COURSES

G3HSC Rhythm Method of Morse Tuition

Complete Course with three 3 speed L.P. records with books	84/-
Beginner's Course with two 3 speed L.P. records with book	60/6
Single 12" L.P. Beginner's with book	50/-
Single, 12" L.P. Advanced with book	50/-
Three speed simulated GPO test. 7" d.s. E.P. record	15/-

Plus 5% to these prices for postage and insurance.

MAPS

AMATEUR RADIO MAP OF WORLD

Mercator Projection — Much DX Information — In Colour. Second Edition 9/-

DX ZONE MAP (GREAT CIRCLE)

In colour (Revised to October 1966) 14/9
(See S.W.M. page 643, January 1967)
Black and White only 5/6
(See S.W.M. page 661, January 1967)

RADIO AMATEUR MAP OF THE U.S.A. AND NORTH AMERICA

State boundaries and prefixes, size 24" by 30", paper 8/9

RADIO AMATEUR'S WORLD ATLAS (NEW EDITION)

In booklet form, Mercator projection, for desk use. Gives Zones and Prefixes 16/-

LOG BOOKS

RSGB Standard Log 7/3

RSGB Log and VHF Contest Log 7/3

RSGB Receiving Station Log 7/3

A.R.R.L.

(Spiral bound) 12/-

A.R.R.L.

(Minilog) 4" by 6" 5/6

(The above prices include postage.)

Available from **SHORT WAVE MAGAZINE**

Publications Dept., 55 Victoria Street, London, S.W.1 . 01-222 5341

(Counter Service, 9.30-5.15, Mon. to Fri.)

(Nearest Station: St. James's Park)

(GIRO A/C. No. 547 6151)